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EDITORIAL NOTES—GAS, &c.

Provisional Order Procedure—Some Suggestions.

WE understand that the Bill which the Board of Trade introduced last year for the cheapening of procedure in connection with Provisional Orders is again to be introduced this session; and, in view of this, there are a few observations we should like to make upon it. It does not appear to us, upon further consideration, that the objection to the existing procedure is so much the expense of obtaining an unopposed Provisional Order, or, at least, an Order unopposed in Parliament, as it is the fear which the promoters have that, when they get into Committee, the local authority will successfully press for what is known as a "Purchase "Clause." It is, of course, in reality not a purchase clause in the technical sense, because the matter has to be followed up at a subsequent period by a Bill to authorize the local authority to purchase the undertaking. But there is quite enough "purchase" about it to paralyze the undertaking, and to damp the ardour of a non-statutory company for a statutory status. It is not difficult to see how prejudicially the practice which has grown up of recent years, of Committees inserting a purchase clause in all Gas Bills promoted by non-statutory companies, when asked for by an opposing authority, will operate against any hopes engendered by the attraction of cheap procedure for Provisional Orders. Moreover, the procedure cannot be said to be cheap, if one has, in addition to an opposition before the Board of Trade, to encounter serious opposition on the question of purchase, if on no other points, before one if not two Committees of Parliament. What, therefore, seems wrong with existing conditions is the practice of Parliament, rather than the cost of the existing procedure. Of course, if the existing procedure can be made cheaper, promoters gain *pro tanto;* but, in our judgment, it must not be considered that the mere cheapening of procedure will be sufficient to induce promoters to put themselves under statutory conditions.

Those who are acquainted with the inner working of the contests between local authorities and gas companies can readily account for the number of cases in which a purchase clause is asked for; and, strangely enough, no evidence is called for by the Committee, in order to show that the ratepayers really desire to become owners of the relative gas undertakings. It is, in fact, left to parliamentary agents to determine what shall be asked for; and in the end, as we have stated, a purchase clause is inserted. Accordingly, the first stage is reached; and a course of education from Westminster then proceeds apace. The cupidity of ratepayers is excited; and in the end a Purchase Bill is generally promoted by the local authority—not by any means, history shows, to the eventual satisfaction of the ratepayers. If the ratepayers really desire to undertake the responsibility of the gas supply of the district, it is not too much to ask on so serious a matter that the local authority should evidence the desire by getting the ratepayers' consent to promote a Bill for the purpose, without waiting until the owners of the local gas undertaking apply to the Board of Trade or Parliament for statutory powers. It is useless, on the one hand, for the Board of Trade to say "Come! "We have cheapened our procedure; therefore put your"selves under statutory restrictions," when, as a matter of fact, the Companies are really, not only being invited to commit suicide, but are expected to pay for the luxury of doing so.

Again, the expense of an unopposed Order, or at any rate an Order not opposed in Parliament, is really not a deterrent to any Company desirous of obtaining a statutory status, although, of course, it is so much to the good if they can obtain their Order more cheaply than at present. What is the real deterrent is the knowledge that, after they have got a workable and satisfactory Order from the Board of Trade, they have still to fight the local authority in Parliament on the purchase question; and the local authority, knowing that the Board of Trade either cannot or do not insert a purchase clause in Orders, and that they have to go to Parliament for it, show no spirit of conciliation while the Order is under consideration by the Board of Trade. Not unnaturally, perhaps, they argue to themselves: "As we "intend going to Parliament, we will give away nothing "before the Board of Trade; but fight for all we can get, "and then go to Parliament for something better, both "as regards price, capital, and other points in the Order." Thus, the practice of inserting purchase clauses in reality defeats the object of the Board of Trade in cheapening the procedure, and accounts for most of the expense connected with the Provisional Order system. The mere cheapening of procedure by the Board will not overcome this difficulty; and we are afraid that, till some means are found by which Companies will be relieved of having to pay the penalty of enforced sale of their undertaking as the price of endeavouring to secure a statutory status, it is little use cheapening the procedure. We suggest, therefore, that, as a matter of policy, local authorities should be given to understand that henceforth under no circumstances will a purchase clause of any kind be put into a gas promoters' Bill or Provisional Order. Purchase powers should only be inserted in a Bill promoted by a local authority. This would take out of the hands of the local authorities a weapon which is in many cases unscrupulously used to force the promoters into concessions which make the measure scarcely worth the taking, and in any event it would ensure that a purchase is only sought to be sanctioned on its merits, and after due consideration by the ratepayers.

The next suggestion we have to make is that the Board of Trade should have power to award costs to promoters where the local authority have been unreasonable in their opposition. It is not too much to say that, in many instances, local authorities have been not only unreasonable, but unscrupulous and even vindictive; and it seems to us that it would be a safeguard against unreasonable opposition if the Board of Trade had power, where they are satisfied that the promoters had made reasonable concessions during the course of what may be called the pleadings in the case (or else at the inquiry held by an official of the Board) to say: "We consider the promoters have quite fairly met "the local authorities; they have been put to unneces"sary expense in resisting the attack by the local autho"rities; and we award the promoters the costs they have "been put to by the opposition." In this connection, we venture to remark that, in our opinion, it would be better in the interests of all parties if Parliament exercised its power to award costs with greater frequency than it now does. At present, there is little or no inducement for promoters to be conciliatory, or for local authorities to be reasonable in their opposition. The result of it is that much money is wasted in parliamentary conflicts, and enterprise is paralyzed.

We are quite aware that these suggestions open up a larger question than that which appears on the face of the mere proposal to cheapen in some respects the existing procedure as proposed by the Board of Trade. What, however, we feel is that it is necessary for the authorities to take this larger view of the matter if a cheapened form of procedure is really to be made attractive to promoters. There is plenty of capital available for gas enterprise in this country. But it must be attracted upon conditions which will ensure to the promoters a fair, if not a liberal, return for their outlay, and a minimum expense with a maximum certainty as to the powers they will get. It is no good to expect promoters, however cheap the procedure may be, to apply to Parliament, if the only result is that it enables the local authority to take the first step towards the acquisition of their property, or (where the Order is one to authorize the

establishment of an undertaking) the promoters are, in a sense, merely put into the position of "pulling the chestnuts "out of the fire" for the ratepayers.

One other suggestion that occurs to us is that the Board of Trade might reduce their fees in the case of small Companies. It appears to be unreasonable that a small Company should be called upon to pay to the Board of Trade the same amount in fees as a larger undertaking which has been working successfully perhaps for many years. Why not have a sliding-scale of fees in proportion to the capital of the undertaking?

Although it is not clear on the face of the Board of Trade Bill what are to be precisely the proposed alterations in the procedure, we believe that it mainly consists in relieving the Companies of the wholly unnecessary expense of advertising the Order, when once granted; but still the Bill is so framed that it would give the Board of Trade power almost to institute any form of procedure they liked, or a procedure which may, in its simplicity, be no procedure at all. Strongly as we are in favour of cheap Provisional Orders, we think there would be a distinct danger in making them too cheap, or the procedure too simple. It might open the door to many wild-cat promotions; and we certainly are of opinion that, in any event, the interests of the gas industry would be best served by retaining such a form of procedure as would necessitate recourse to one or other of the reputable firms of parliamentary agents who can always be relied upon to guide promoters with ability and economy through the departmental and parliamentary mill. The saving effected by instituting a procedure so simple as to encourage anybody to believe that he could obtain a Provisional Order, would, we feel sure, be of "penny wise, pound foolish" character.

Reflected Training.

Most cordial welcome was given to Mr. James Paterson on entering for the first time into prominent official position in the work of professional organization as President of the Southern District Association of Gas Engineers and Managers. The cordiality of the welcome was without question given on account both of individual popularity and the fact that the new President is the bearer of a name that ranks high in gas technics and professional regard. The name of Paterson in the gas industry stands, as it has stood through a long past, for solid and successful work, and for independence of thought and its expression in the polemical questions of the succeeding days. The attributes in this regard of sire have been transmitted to son, as is seen in the inaugural address with which the members of the Southern Association were delighted on Thursday. This, we hope, is but the beginning of a prominent career in the high places of the profession. In addition to his presidency this year, opportunity is spread before Mr. Paterson to make his mark as organizer of the Commercial Section of the Association.

In the address, the only superfluous words were those at the end, in which the President pleaded for the "kind indul-"gence" of the members for "the egotistical manner in "which" the address "has been framed." There is a misapplied term in the sentence; for the composition ran in anything but egotistical vein. It was an ingenuous declaration of view and a plain statement of experience on many matters, from the educated analytical mind, and free from the restraint of laboured effort. Several subjects were dealt with, without any thought of obligation to conventional sequence—from the training of young engineers to the sale of gas for power and heating, including such interesting incident as the maze and worry created, by the continued existence of a disused drain, in tracking an escape of gas. A beginning was made on distribution, and an ending on that kindred subject—commercialism, other topic being taken up *en route* just as it crossed the mind of the versatile composer. There was a freshness in it all; and it contained a large amount of the constituent that is acceptable in presidential utterances—individuality.

In the address there is a reflection of much of the training of the President. He was brought up in a good school, in which it was taught that thought and action should have the closest companionship. Towards the end of the address, he evinces a strong belief in the course of training that he himself was subjected to being the correct one. He does not say as much, but we may: The product of training is the best test of the correctness or otherwise of its course. We may still theorize and contend over whether an engineering school course should precede the workshop, or the reverse, but, after all, results must decide, though what is good for one man is not necessarily good for another. One man may not be able to mentally assimilate principles and theories until his mind has been stimulated to interest by practical processes of the workshop. Another may not be able to extract the full benefit of the workshop until he has assimilated theories and principles. It is the natural order that grounding in fundamental truths and laws should precede practical work; and this is the belief of the President. A knowledge of the, so to speak, alphabet and the grammar of engineering is helpful to the subsequent practical composition. It is preferable that a youth should be aware, from his own knowledge, of the reason for the doing of a thing, and the reason it is done in a certain way, at the time he is occupied upon it; and not go through the months of work ignorant of these matters, and then learn afterwards the wherefore, by which time probably there is also false impression to be wiped from his mind. Moreover, the probability is that, if the knowledge had been the pupil's earlier, he would have looked at his workshop practice with different eyes, and from it extracted, through his educated ability, more that was helpful.

Carbonization is a notable side of the technical work at Cheltenham; and by the technical chief at Redhill certain convictions are held in this regard that, if we read aright, are incapable of extirpation or change. The President has a "deeply rooted" preference for built-up retorts, and does not think "wild horses" "could convert" him from belief in the dry main for the attainment of the best carbonizing results. Mr. Paterson was speaking metaphorically; but the bare suggestion that such extremity of barbaric treatment as the use of wild horses would be required to produce conversion on such a sober controversial subject as the propriety or otherwise of the dry main, is a challenge to the advocates of the liquor seal that few of them, so far as Mr. Paterson is concerned, will think it worth while to take up. The high results from simple carbonization methods at Cheltenham are well known; and Mr. R. O. Paterson attributes this, as do other Midland gas engineers the results of their working, to the use of the dry main. Small wonder then at the dogmatism of the son. There seems to be a growing reversal of opinion, too, in favour of brick retorts; for, with Mr. Paterson, no less than three Presidents have, within a short space of time, announced, in their inaugural addresses, their preference for them. There was Mr. J. W. Morrison expressing himself, in his address from the chair of the Manchester Institution at the end of February, a strong advocate of them. His predecessor in office, Mr. T. Duxbury, was enthusiastic on the subject. The disadvantages that the exponents of the virtues of brick-built retorts assemble about the moulded form are not wholly conclusive as to the objects of their personal affection being, on balance, the more economical. They are more costly in the first instance; and (we do not hear anything much about this now) it was common knowledge at one time that the fuel account with brick-built retorts was higher than with ordinary moulded ones. It would be instructive to have, after such revival of the advocacy of these retorts, a fresh balance-sheet brought out, showing the relative performances per mouthpiece under comparable conditions, and the relative costs of working and of upkeep. Before leaving manufacturing questions, there is a brief reference in the address to naphthalene that should not be overlooked. At Redhill as much naphthalene is made as at other works; but to a very simple arrangement of condenser is ascribed the fact that as much as possible of the light oils is retained in the gas, which prevents naphthalene deposition.

The same practical experience threads itself through the references in the address to distribution questions. The inefficiency of the molten lead joint with steel mains that Mr. Paterson has found simply confirms the experience in other parts of the country; but in the address for the first time a rational hypothesis is advanced as to the cause of the failure of cast joints with steel pipes, which hypothesis it would be a matter of interest to have ratified. Anyway there is no doubt as to the inadvisability of using cast-lead joints in steel pipe work; and as cheap, if not cheaper, are lead wool joints. And it is undeniable that for staunchness, cast-lead joints are inferior. This has been found in high-pressure work; and, under heavy trial pressures, lead wool joints have stood firm at considerably higher points than cast-lead joints. Troublesome experiences have affected the President's belief as to the wisdom of his first adoption of molten lead joints when laying steel mains; and at Redhill,

it is quite safe to say, some other system will in future be preferred. A point to which more attention might profitably be paid in connection with the distribution department is that of the testing of meters. The Sales of Gas Act prescribes a pressure, for testing for percentage of error, of 5-10ths of an inch; while district pressures are usually (say) at 20-10ths. The incongruity of test and the practical requirement in service of the meter are at once apparent; and Mr. Paterson has a suspicion, which is to some extent borne out by test, that a not inconsiderable quantity of gas consumed by bye-passes, if there are not many on one meter, runs through the meter without being registered. It is a point worth further investigation in these times when it is recognized that every scrap of economy, so long as it does not trespass on reasonableness and fair-dealing, contributes to the general well-being of an undertaking.

In treating of commercial matters, the President's views are equally attractive. He is a disciple of the "new commercialism" in the gas industry, which, among other matters, recognizes that the primitive trading rule of the industry of one price for all purposes must be discarded for competitive rates in every branch of trading. It has to be admitted that these are not times when sentimental regard for custom can be allowed to stand in the way of business. Every gas administrator has to ask himself: "Is a certain "class of business worth retaining? What can I negotiate "the business for without detriment to the other branches of "the business? And can I afford to give it up, as I must do "if I do not take it at a lower price than that charged in other "branches of the business?" We have the answers that the President would give to these questions crystallized in the single pregnant sentence: "Let us boldly take our stand, "and sell gas for power purposes at competitive rates." It is not a business that need be taken up recklessly. The principal load of a gas-works is its lighting custom; and there are capital, depreciation, management, collection, and establishment expenses that must be met for this custom that would not be in any way adversely affected by taking on power-gas consumers at a lower price than the ordinary. If we stand between losing or retaining or gaining this business, let there be careful consideration before decision as to the charges that will remain the same if the business is abandoned, and see whether the business cannot be retained or gained at a price covering somewhat more than the direct charges involved in so supplying gas for power purposes. In our opinion, if there is any profit at all above the actual cost of the gas as put into the holder to be obtained during the light loads of daytime, which profit would be lost by a too rigorous view of average capital and other charges, then it is the duty of the administration to get that profit both in the interests of the undertaking as well as of the consumers in the other branches. In profit, as in most other things, every little helps.

There is no mistaking the position. We have got to trade on competitive lines in each branch of business; and each branch is perfectly independent of the others in the character of the competition to be met. We have also to remember this, that loss of power business, through refusal to compete, may mean the loss of the lighting of large establishments; the refusal to compete to-day, and allow business to slip from our grasp, may also mean that it will be impossible to retrieve that business in the time to come when gas is made and supplied on its calorific value only at lower terms than to-day. We need not go to the extremes of the electricity people. There can be reason in all things. The extremes to which the electricity purveyors have gone are recoiling on them. In many places, with the growth of their power business at extraordinarily low prices, the margin of profit is not equal to standing the fluctuations of market prices and the lowering of consumption through depressed trade. Manufacturers who use suction-gas plants are finding out daily the necessity, in order to economize time, of a town-gas stand-by, as well as the defects of the plant that came to them with the recommendation only of an attractive cost per brake horse power. Having regard to these conditions of the competitors, the opportunity is good for making a bold bid for the retention and the extension of the gas-power business. But beyond power, the President thinks that the ultimate replacing of all coal fires for heating and all coal ranges for cooking by economically designed gas heating and cooking stoves should be the aim and goal of the gas manager. There is a laudable boldness about this which speaks of an ardent commercial spirit and a splendid hopefulness. From several quarters, the success of Mr. Paterson in this direction will be watched with care and interest. There is much else in this particularly readable and thoughtful address that invites comment, but we must refrain.

Metropolitan Gas Companies' Accounts.

In another part of the "Journal" will be found the usual tabular statement of the accounts of the Metropolitan Gas Companies for the past year. It will be seen that the total capital, including premiums, engaged in the supply of gas in London on Dec. 31, 1908, amounted to £38,436,874; being a decrease of £2638. This sum represents the difference between the £21,045 by which the capital of the Gaslight and Coke Company was reduced and the addition of £18,407 to that of the Commercial Company. The total income was £6,848,146, and the expenditure £5,122,076; leaving a gross profit of £1,726,070—being at the rate of £4 9s. 10d. per cent. on the capital, and £35 18s. 6d. per cent. on the total gas-rental. The figures for 1907 were £4 11s. 7d. and £36 10s. 8d. The second table, giving the results of working out the items in the preceding one on the basis of each 1000 cubic feet of gas sold, shows that the Gaslight and Coke Company stand the highest, and the South Metropolitan Company the lowest, in the matter of capital outlay, income, expenditure, and gross profit. Taking the mean of the three Companies, the figures are: Capital, 20s. 6·84d.; income, 3s. 7·98d.; expenditure, 2s. 8·89d.; and profit, 11·09d. Compared with 1907, there is an increase of 2·28d. in the capital, of 0·79d. in the income, of 0·9d. in the expenditure, and a decrease of 0·11d. in the gross profit. The third table shows that there was an increase of £60,070 in total revenue and of £94,215 in expenditure; so that the profit was reduced by £34,145—viz., from £1,760,215 to £1,726,070. The heaviest item of increase in expenditure is, of course, that relating to coal and oil, which stands at £88,646; the next highest being the additional £74,605 paid for the repair and renewal of meters and stoves. On the other hand, there were reductions of £17,868 for purifying materials, £24,929 for salaries and wages connected with manufacture, and £41,672 for wear and tear.

The following table shows the carbonizing results of the three Companies, so far as they relate to the manufacture of gas from solid raw material only. Though they do not vary much from those for the preceding year, they show a further increase in the quantity of gas produced in the case of each Company; the mean make per ton being 10,939 cubic feet, compared with 10,885, 10,811, and 10,539 cubic feet in the three preceding years.

Table *showing the Residuals Produced and the Gas Made per Ton of Coal by the Metropolitan Gas Companies in the Year* 1908.

Name of Company.	Coke.	Breeze.	Tar.	Am. Liq.	Gas.
	Cwt.	Bushels.	Gallons.	Gallons.	Cub. Ft.
Gaslight and Coke .	12·40	4·71	10·17	32·74	10,974
South Metropolitan .	12·39	5·22	9·89	37·80	10,811
Commercial	12·25	6·66	12·71	34·10	11,386
Mean per Ton . .	12·38	5·04	10·23	34·76	10,939

A World-Wide Field For Gas.

To-day, in another part of this issue, appears the twenty-fourth, and last, article of the series that has been running through our columns for nearly twelve months under the title of "Round the World—And Some Gas-Works." To Mr. Maurice Graham, to whose journeyings, to whose pen, and to whose camera we owe the original conception, the graphic description, and the attractive illustrations of this varied and interesting set of contributions, our best thanks and those of our readers, both at home and abroad, are due; and we feel sure that we are voicing the views of many engineers and managers in many lands when we take this opportunity of recording our, and their, appreciation of the generous and self-imposed labours which have resulted in so instructive and so unique a collection of visits to so many and such different gas-works.

Mr. Maurice Graham has, throughout a quarter-of-a-century's work as a civil, mechanical, and gas engineer, given many evidences of his ability and activity. His industry and his energy are alike known to be unbounded; and both have been prominent in different spheres of engineering. But perhaps in nothing previously have his qualities been so forcefully shown as when, while making a tour

round the world, he has voluntarily undertaken the task of visiting, describing, and photographing all sorts and sizes of gas-works which he came across in the course of his journeys. Even where the light of coal gas does not as yet shine, the possibilities of the future in this respect did not pass unobserved by this engineer. In all, about sixty gas-works have been inspected; and in a little more than a year a distance of approximately 55,000 miles has been covered by land, by sea, by river, by rail, and by road. When introducing the first of these articles—that on Egypt—we called special attention to the intimate connection between engineering and travel; and what we then said is emphasized on looking back over the long route traversed and the experiences described by Mr. Graham. His journeyings have taken him from the gas-works farthest South at Invercargill, New Zealand, 46 degrees South, to Dawson, Yukon, in the Far North at 65 degrees North; from Yokohama in the Far East, to Victoria, British Columbia, in the Far West. He has experienced the heat of Hong-Kong and the cold of Klondike; the temperatures varying from above 100° Fahr. to 30° below freezing point. Within these extremes gas manufacture is profitably carried on and gas distribution successfully effected, with all the varying requirements and precautions thereby necessitated.

What are the salient aspects that suggest themselves from a general perusal of the twenty-four articles of this gas tour? Perhaps the first distinguishing feature is that they show the unlimitable field for gas that exists the whole world over. We in England are apt, sometimes, to regard gas manufacture and supply in too narrow a way, and to talk of the "point of saturation." But even at home a wide domain still lies in front of us in the direction, not only of gas for lighting, but more particularly for heating and industrial purposes. How much wider is the vast territory for coal gas and its multifarious uses if, for a moment, we cease to be insular and become, not merely Imperial, but universal? Look at our Empire in the East—India, with its 300 millions of people of ancient civilization, but with ever-growing modern minds and needs. The gradual infiltration of Western ideas, the almost imperceptible effect of spreading education, and the consequential slow and sure dawning of fresh ideas and new needs and necessities will inevitably lead, in the fulness of time, to demands in many and varied directions, among which gas and its utility will not be the least evident. It must have struck many as somewhat astounding, in glancing through Mr. Graham's articles on India and Burma, to find that large towns under British control, and with, in some cases, developing industries, such as Delhi, Agra, Cawnpore, Lucknow, and Benares, each with populations of 200,000 people or more, the Capital City of Madras with 500,000 inhabitants, and Mandalay and Rangoon, with between them nearly as many people, are all without gas. Surely among these dense populations there is need for some of the civilizing influences of public gas lighting, to say nothing at present of domestic comforts and conveniences. Mr. Graham very significantly touched on the importance of well-lighted streets, where dangers to life and health are unavoidably increased by dirt and darkness among congested masses of humanity. The certain march of civilization is bound, sooner or later, to include in its wake the ameliorating benefits of gas. Still farther East, in Japan, we learnt, in a valuable set of five articles, of the wonderful progress that gas has made since its quite recent—in some cases—introduction in a few of its populous centres. A demand has been created; and increases in gas consumption of 100 per cent. per annum are not unknown. This demand, it is safe to say, will go on ever extending among the fifty millions of alert and intelligent Japanese.

The Australian contributions brought nearer to us the conditions and circumstances of our Colonial *confrères*. We venture to say that the doings and sayings of the Victorian Gas Association, as reported in our columns last month, have a more personal interest for us now that our readers have seen the faces of Mr. S. E. Figgis, of Ballarat, Mr. W. Pain, of Bendigo, Mr. T. Lord, of Geelong, and Mr. P. C. Holmes Hunt, of Melbourne, in the illustrations given of their gas-works; and from the descriptions of these works we are able the better to realize the points of their discussions and the queries of their "Question Box." So, too, with our friends at the Antipodes in New Zealand. We have seen that many of their gas-works are undergoing reconstruction and improvement to keep pace with increasing population and growing demands. We understand how virgin forests supply the fuel for, and facilitate the establishing of, electricity stations. But coal gas is required none the less. Similar local advantages will explain the situation in Canada and the West, where bountiful Nature pours out its supply of "white coal," in the shape of rivers and falls of water, easily utilizable for the production of electric current, notwithstanding which, however, and in spite of attempted restriction of gas by electrical controlling companies, we see the recognition of the advantages of gas leading to steady growth and advancement.

Lastly, the tour "Round the World—And Some Gas-Works," which Mr. Graham has taken us, has exemplified the strength as well as the world-wide extent of the work of British gas engineers and contractors in this country. Their apparatus, machines, purifiers, holders, and meters, are found in the distant places of the earth, and carry forth and maintain their reputation for thoroughness, soundness, and efficiency. Manufacturers may benefit by hints given here and there, and they may profitably apply themselves to the cultivation and the extension of new markets. The articles, which are concluded to-day, will have served no small or insignificant purpose if they have, as we believe, directed the attention of traders to certain important matters and openings; and they undoubtedly have increased the knowledge, respect, and sympathy, of the British gas engineer at home for his Colonial colleagues and foreign friends abroad.

The Supply of Lists of Shareholders.

In our "Legal Intelligence" will be found a report of the appeal of the Gaslight and Coke Company against the decision of Mr. Justice Warrington in an action brought by Mr. H. P. Davies for a *mandamus* directing the Company to supply him with a copy of the shareholders' address-book, in accordance with section 10 of the Companies Clauses Consolidation Act, 1845, which they had refused to do on the ground that it was required for improper motives—viz., the circularizing of shareholders on behalf of certain companies in which the applicant was interested. His Lordship granted the injunction, holding that the Court could not go into the question of motives. The Company decided to appeal; and though their case was most ably argued by Mr. Rowden, K.C, and Mr. R. J. Neville before the Master of the Rolls and Lords Justices Fletcher Moulton and Farwell, we regret that their efforts were unavailing. Without calling upon Counsel for the respondent, their Lordships dismissed the appeal, with costs. We may refer our readers to the full report of the case which appears elsewhere.

Good Prospects for the Gaslight and Coke Bill.

It will be seen, from a report which appears in another column, that there is every probability of the Bill of the Gaslight and Coke Company going through both Houses without serious opposition. It may be remembered that the London County Council presented a petition against the Bill; their objections being based on five grounds. In the first place, they said there was no proposal for a reduction of the standard price in consideration for the suggested reduction of 2 candles in the illuminating power of the gas. Next, they thought that a standard of calorific power for gas should be fixed, and the Company made liable for deficiencies. Then, further, they considered that the Company should be required, in the event of the proposed alteration of the illuminating power being sanctioned, to supply the consumers free with burners suitable for this lower-power gas. The Council also thought it should be made clear in the Bill that the price charged by the Company for gas of 14-candle power south of the Thames should be the same as that charged by the South Metropolitan Company for gas of the same illuminating quality, in accordance with the Amalgamation Scheme of 1883; and that the price for public lighting in the whole of the Company's area should be the same as the Company's lowest selling price to any consumer. Finally, it was asked that the Company should be required to give the Council notice of their intention to lay new or alter existing mains and pipes in any street in which there is an existing or an authorized tramway of the Council. The Parliamentary Committee of the Council put themselves in communication with the Public Control Committee in regard to the provisions of the Bill; and their views are embodied in the points given above. The report shows that, before entering into negotiations with the Company, the former Committee sought the

assistance of Professor Frankland and Mr. Charles Hunt, and obtained reports from the Comptroller (Mr. H. E. Haward) and Chemist (Dr. Frank Clowes). As the result of interviews, the Company have agreed to reduce the standard price by another 1d.—to 3s. 2d.—and to set up a calorific standard, subject to a margin of 10 per cent. before a penalty is incurred; the latter arrangement to be subject to revision by the Board of Trade, on the request of either the Council or the Company, at the end of every three years. In addition, the Company have undertaken to meet the Council in the matter of the supply of free burners and the charge for gas south of the Thames. With regard to the laying of mains, while they could not agree to the insertion of a clause in the Bill, they have promised that their Engineer shall notify the Chief Engineer of the Council whenever he proposes to lay any new mains in streets where there are, or may hereafter be, tramlines. The outcome of the negotiations has been the coming to an arrangement by which provisions satisfactory to the Council will be inserted in the Bill, and the opposition withdrawn. This, we are pleased to say, clears the ground to a very large extent. The Bill stood for consideration in Committee last Friday; but it was postponed first till to-morrow and afterwards till Thursday. There are still some petitions against the Bill; but we do not think they will give rise to much contention.

Control of Monopolies by Public Commission.

Dr. B. H. Meyer, the President of the Wisconsin Public Utilities Commission, recently gave an address which, as the "Financial Times," in the course of a rather long notice of it, remarks, gives one of the reasons why in America municipal trading has not captured the popular imagination to the same extent as here, the tendency instead being more in the direction of controlling monopolies by means of Commissions appointed for the purpose. He urges that such a Commission as the one of which he is President takes "the utilities" outside the region of politics, and that all students of municipal affairs well know that in this elimination of politics from the management of utilities they have removed one of the greatest and most persistent sources of corruption and bad government. Of course, this is a consideration which does not apply in the same way over here. We have frequently deprecated the transaction of municipal business in England on Party lines—that is to say, the election of the members of a council as Conservatives, Liberals, or Radicals, and the subsequent obedient following by the chosen representatives on all occasions of the lead given by the Party chief in the council. This is not at all what Dr. Meyer means by politics in connection with American municipalities. But in addition to this political aspect, he sees many other advantages in the Public Service Commission. For instance, it ensures the public being catered for at reasonable rates, and thus tends to eliminate feuds between the citizens and managers of public monopolies; and in various ways it tends to raise the standard of commercial morality. Then it compels companies to put their affairs on a business basis; and, by its supervision of capital issues and other financial matters, it places investments in public utility enterprises upon a more stable foundation. If all these benefits are realized—and evidence goes to show that the operation of these organizations does result in some good—Public Service Commissions may perhaps be regarded as filling a want in the United States; but in that case it seems that the regulation of monopolies is one of the things that we manage here better than they have hitherto done on the other side of the Atlantic, for the statutory obligations to which "utility companies" are subjected in the United Kingdom do not leave much of an opening for Public Service Commissions.

Passing of the Amman Valley Gas Company.

Those of our readers who have followed the references in the "JOURNAL" to the parliamentary work of the present session will probably remember that one of the Gas Bills read a first time in the House of Commons on the 18th ult. was that promoted by the Amman Valley Gas Company to obtain re-incorporation, with power to manufacture and supply gas within the town and urban district of Ammanford and adjacent places, at a maximum price of 4s. 6d. per 1000 cubic feet. The proposed share capital was put at £24,000, with £8000 of loan capital. The Bill was opposed by the Ammanford Urban District Council, a neighbouring Rural District Council, and the promoters of the Ammanford Gas Bill. Concurrently with the first reading, the Bill was, in accordance with Standing Orders, referred to the Examiners; but it will be seen from our "Parliamentary Intelligence" that, on the motion of the Chairman of Ways and Means, the order then made was last Thursday read and discharged, and the Bill withdrawn. Next day, as shown by our "Legal Intelligence," an application was made to Mr. Justice Parker for the appointment of a receiver, in connection with an action brought by Messrs. R. & A. Main, the holders of £730 out of a total of £12,500 of the Company's debentures. The matter had been before his Lordship at a previous sitting; but the Counsel who then represented the Amman Valley Company had no brief on the second occasion. His Lordship ordered the matter to stand over for a week, to allow Counsel for the applicants to strengthen his evidence. This all means that the old Amman Valley Company—one of the promotions of No. 99, Cannon Street—is coming to an end; the Ammanford Bill will be allowed to go forward; and the new Company will (if the Bill passes) take over the concern. But more of this in our "Notes from Westminster" on p. 843.

Public Lighting at Plymouth.

After taking three months to think about it, the Electricity and Street Lighting Committee of the Plymouth Town Council decided on Friday to reply to the letter from the Plymouth and Stonehouse Gas Company with reference to experiments for the better lighting of the streets. As its name suggests, the Committee is primarily concerned with the administration of the municipal electricity undertaking. Street lighting is only part of its business, and apparently a very minor part. It appears to have been rather in the interests of the electric light works than of an improvement in the illumination of the thoroughfares of the town that consideration was given to the question of erecting special arc lamps at certain prominent points in the town. The fact that the question was raised suggests that the Committee may have become convinced that the present electric lighting is unsatisfactory—as, indeed, it is. It, however, afforded an opportunity to the Gas Company to suggest that the experiments should not be limited to a demonstration of the use of electricity for the purpose, but that they should have an opportunity of showing what can be done with gas in the way of public lighting. The Committee have shown no particular anxiety to consider this proposal, which was made before Christmas; and in discussing it, they appear to have been mainly seeking for some means of avoiding the challenge which the Gas Company's offer implied. According to the published report of the Committee's proceedings, it was "decided to thank the Gas Company for their letter, and to invite them to submit any suggestions they might have to make with regard to any improvement in the existing system of gas lighting." A reply in these terms will not enhance the reputation of the advocates of electric lighting in Plymouth for courage and straightforwardness; nor is it likely to satisfy the Gas Company and those who believe that gas is both cheaper and better than electricity for illumination purposes. As the Gas Company will no doubt point out, it is not a question of the "improvement in the existing system of gas lighting." If the lighting had to be improved in the portion of the town which is lit by gas, it could only be done by developments on existing lines—by putting in larger burners for the small ones which the Corporation have installed in the bye-streets, and by the use of double burners instead of single ones in the lanterns in the more important thoroughfares. The need of this has been frequently insisted upon since the system of incandescent gas lighting was introduced; and the Electricity and Street Lighting Committee can hardly be ignorant of the views of the Gas Company upon this subject. What the Gas Company proposed was, not so much to show that the gas lighting could be improved, but that, both on grounds of economy and efficiency, gas is to be preferred to electricity for the lighting of the thoroughfares in which electric light is now in use. This "very reasonable proposal," as one of the local newspapers terms it, the Committee have evaded, as they have all previous suggestions for submitting the two methods of lighting to definite proof. Their attitude in the matter is not courageous; but it has the merit (such as it is) of being safe.

Trade Unions and National Insurance.

Reference was made in our issue for the 16th ult. to the fact that a deputation of the Parliamentary Committee of the Trades Union Congress had visited Germany and issued a report on the

contributory workmen's insurance schemes in operation there. There are in Germany three distinct kinds of compulsory insurance affecting workmen—insurance against accident, insurance against sickness, and insurance against invalidity and old age. In regard to accidents, the personal liability of the employer is changed into a collective charge upon the entire trade concerned, under a State guarantee. The necessary amount for insurance against sickness is contributed to the extent of two-thirds by the insured and one-third by the employer; while the invalidity and old-age insurance is carried out by contributions to an equal amount from employers and employed, supplemented by a yearly contribution from the Government of 50 marks for each pensioner. The men, it seems, do not complain of the deductions from their wages which these provisions necessitate; but the employers do find some fault with the expense to which they are put, on the ground that their goods are thus rendered more expensive, which lessens their chance of successful competition with firms in countries where such insurance is not compulsory. But so far from the present arrangements being considered by the authorities as being too costly, we learn from the report that the question of insurance against unemployment is receiving special attention in Germany, and that it is approved in principle, though considerable practical difficulties are being anticipated. Unemployment, of course, arises from a variety of causes; and it cannot be said that in all cases it is caused through no fault of the workman himself. The idea of insuring against unemployment a man who deliberately declines to work, is absurd; and, therefore, when one considers the possibility of strikes and perhaps sometimes of a desire for idleness, it seems clear that an extensive system of differentiation would be entailed by the national adoption of such insurance. However, the report does not suggest that the difficulties are insuperable; and the fact that, in spite of them, attempts have been made to deal with the question in various parts of Germany, is pointed to as evidence of a strong feeling that something must be done in this direction. In Cologne and Leipsic, it is stated, municipal insurance establishments for unemployed are in existence; while Strasburg has introduced "the Ghent system" of subsidizing Trade Unions which grant unemployment benefits. At a special congress of Trade Unions in London last week, three questions, arising practically out of this report, were set down for consideration: (1) Are you in favour of the establishment by the State or municipal authorities of labour exchanges, providing central halls or meeting places for unemployed men and women? (2) Are you in favour of the burden of unemployment benefit (at present borne solely by organized labour) being proportionately shared by the State, the employers, and workpeople? (3) Are you in favour of the State establishing schemes of insurance against sickness and invalidity for the benefit of workpeople? The second and third questions were referred back to the Parliamentary Committee to obtain opinions and bring up proposals at the next annual congress; but the first was straightaway answered in the affirmative. As usual, there will, it seems, be no lack of proposals for industrial legislation at the next Trades Union Congress.

A joint visit of the Eastern and Western Districts of the Scottish Junior Gas Association is to be made to the works of the Carron Company next Saturday afternoon.

Mr. J. D. C. Hunter, Chief Clerk at the West Greenwich Gas-Works, has been elected a Director of the South Metropolitan Gas Company, as representing the staff, in place of Mr. C. T. Drumgold resigned.

There was an interesting gathering at the offices of the late Chelsea Water Company on Friday, the 12th inst., when the officers and workmen assembled for the purpose of presenting, as a token of their esteem, a beautiful inlaid aneroid barometer, bearing a suitable inscription, to Mr. Henry J. Gooch, Assoc. M.Inst.C.E., the last District Engineer of the now extinct Company. When the undertaking was acquired by the Metropolitan Water Board, he elected to retire. During his service with the Company, he was Resident Engineer on most of the important works carried out in a period of twenty years. Among these may be mentioned the placing of the district under constant supply, and the removal of one of the old landmarks of the River Thames—well known as being the starting-point of the Oxford and Cambridge Boat Race—the aqueduct across the River at Putney. In building the present bridge, it was necessary to erect a temporary aqueduct, demolish the permanent one, and during the construction of the bridge relay the whole of the trunk mains over it—work which lasted nearly two years. Mr. Gooch is commencing private practice in Westminster with the good wishes of his many friends.

THE LIVESEY MEMORIAL FUND.

We have received from Mr. Walter T. Dunn the following list of further contributions to the fund:—

1909.		£	s.	d.
March 15	Amount already acknowledged . .	8584	4	1
,, 16	Bournemouth Gas and Water Company	52	10	0
	Bernard F. Browne, Buenos Ayres .	5	5	0
	Crook Gas Company	3	3	0
	William Hardie, North Shields . .	2	2	0
	Charles Potts, Hyde	1	1	0
,, 17	Coatbridge Gas Company	2	2	0
	F. Templer Depree, Exeter . . .	5	5	0
	T. Glanfield, Exeter	5	5	0
	Stephen Simpson, Exeter	5	5	0
	H. J. Westlake, Exeter	5	5	0
	Willey and Co., Limited, Exeter . .	5	5	0
	David Terrace, Middlesbrough . .	2	2	0
	Charles Hulme, Uxbridge	1	1	0
	F. W. Rapkin, Dartford.	1	1	0
	W. W. Townsend, Hereford . . .	1	1	0
,, 18	A. W. Archer, Ponders End . . .	1	1	0
	Wm. Bugby, Southall	1	0	0
	W. S. Morland, Gloucester . . .	2	2	0
,, 19	C. R. Adamson, London	1	1	0
	Ashton Gas Company	15	15	0
	William Cash, London	2	2	0
	R. E. Gibson, Liverpool	1	1	0
	Wm. A. Hounson, Brighton . . .	21	0	0
	Herne Bay Gas and Coke Company .	10	10	0
	Ipswich Gaslight Company . . .	52	10	0
	Andrew M. MacLeod, Glasgow . .	1	0	0
	Royston Gas Company	2	2	0
,, 20	Birkenhead Corporation Gas Committee	10	10	0
	H. J. D.	2	2	0
	Elstree and Boreham Wood Gas Company	2	2	0
	Sidmouth Gas Company	2	2	0
	Worsbrough Dale and Worsbrough Gaslight and Coke Company . .	1	1	0
,, 22	D. H. Anderson, Bastia, Corsica .	1	1	0
	Felixstowe Gaslight Company . .	2	2	0
	Forbes, Abbott, and Lennard, Shoreham	10	10	0
	Guildford Gaslight and Coke Company	5	5	0
	Southport Corporation Gas Committee	10	10	0
	Total	£8840	6	1

OBITUARY.

HOWARD CHARLES WARD.

We regret to record the death last Tuesday, at his residence, Lymington, in his 83rd year, of Mr. Howard Charles Ward. Deceased was formerly a Director of the City of London Gas Company, having been elected as far back as 1854; and he became connected with the Gaslight and Coke Company on the amalgamation of the undertakings in 1870. He was a member of the Board, and eventually became Deputy-Governor; and it may probably be remembered that he was present at the last meeting of the Company, when he expressed his great pleasure in seconding the motion for the re-election of Mr. Corbet Woodall, the Governor. The latter, in submitting a similar motion on behalf of Mr. Ward, referred to his long connection with the Company, and to his unflagging interest in its prosperity. Almost immediately after the meeting Mr. Ward was confined to his bed. He had attended a Court of the Directors, at which, as notified in the "Journal" at the time, he announced his intention of relinquishing the position of Deputy-Governor; and Mr. Ulick J. Burke was appointed his successor. In referring to the matter, we pointed out that this stepping-down to the rank of ordinary Director was but the result of a natural desire on the part of Mr. Ward for a release, at his advanced age, from some of the responsibility which he had well shouldered during his years of greater physical power and energy. The release was unhappily not long enjoyed.

Mr. Ward was for many years a Director of the Brentford Gas Company; and for thirty-six years he occupied the chair, during which period he never missed a meeting. This position he vacated before the August meeting in 1907, and was succeeded by Mr. Burke, who, when referring to the change, said the excellent position of the Company was largely attributable to the constant supervision of, and the interest taken in it by, his predecessor. In seconding the motion for the adoption of the report, Mr. Ward took the opportunity of explaining his reason for relinquishing the chairmanship. He said he had outlived the Directors three or four times, and stood before the proprietors at nearly 81 years of age. He therefore thought it was time he left the administration of the Company's affairs to younger and more energetic men; and he expressed his happiness in knowing that there were many thoroughly active and able men around him to carry on the work. He concluded by thanking the proprietors for the kindness they

had always shown towards him, and for the cordial support he had received from them during his career.

Mr. Ward did not suffer from any particular complaint; and his death was due to purely natural causes. He was a man of genial temperament, which he retained to the last. He possessed, as he deserved, the highest esteem of his fellow-Directors, and the confidence of the proprietors of the Companies with which he was associated—one being the Portsea Island Gas Company. The funeral took place on Saturday at Hordle, and was of quite a private character. Owing to the distance from town, it was desired by the relatives that none of the deceased gentleman's colleagues on the Boards of the Gaslight and Coke or Brentford Companies should think of attending. But Mr. Reginald Neville, a Director of the Brentford Company, was able to be present.

The death occurred at his London residence last Friday evening, in his 60th year, of Sir EDWARD BOYLE, Bart., K.C., whose name is well known to most of our readers in connection with his work on "Rating." Early last year he was taken so seriously ill that he was unable to continue his extensive practice in his own special branches of assessment and compensation under the Lands Clauses Consolidation Act, 1845, in which, by both training and inclination, he was peculiarly fitted to excel. He was the son of a civil engineer, and was for some years a surveyor before he was called to the Bar in 1887, and took silk in 1898. On entering the legal profession, he was soon retained in some very important cases, and was specially successful in those relating to assessment. He was one of the tribunal engaged in the arbitration which took place a year or two ago between Mr. W. H. Lever and the Liverpool Corporation in regard to property required by the Corporaton for the purposes of their water undertaking. Deceased was created a baronet in 1904; and his son, Mr. E. Gurney Boyle, a member of the Inner Temple and of the South-Eastern Circuit, succeeds to the title.

We regret to record the death last Friday morning, as the result of an attack of influenza, of Mr. WILLIAM HARRIS, the Chairman of the Peterborough Gas Company. Deceased was formerly in business in the city as a grocer; and he was the first to use gas lighting in his establishment. He retired after a quarter-of-a-century's successful work, and devoted himself more closely to the interests of the Company, with which he had a long connection. He was a Director for about forty years, and had been Chairman since the early part of 1873; and during the whole of this long period he never missed a meeting of the Board or of the proprietors. Apart from the Gas Company, he was the pioneer of the Peterborough Freehold Land Society, and was its President till his death. He took an early part, as one of the Improvement Commissioners, in the government of the city; but he did not enter the Council when the incorporation took place. In referring to the life-work of the deceased, a local paper said: "Altogether he was one of the grand old men of Peterborough City, who helped so well to put in the foundations of the great superstructure as she now is, and is continuing to become; a kind-hearted Englishman of mental balance and discretion; a pattern in his home as well as in his family life; and a loyal citizen of a city which must for many a year feel the loss of his strong individuality." Mr. Harris was in his 82nd year; and he leaves a widow and two daughters.

PERSONAL.

Mr. P. N. LANGFORD, Works Manager at the old gas-works of the Coventry Corporation, has been appointed to a similar position at the new works at Foleshill; his salary being increased by £50 per annum.

Many of our readers are doubtless aware that Mr. THOMAS NEWBIGGING has now for some years been connected with the Manchester Literary Club. Owing to losses which this body has lately sustained, Mr. Newbigging has become the "Father" of the club; and the event was celebrated by his fellow-members by inviting him to a dinner at the Grand Hotel last Thursday evening. Mr. George Milner presided, and, in proposing the health of the guest, first went through the record of Mr. Newbigging as a member, an honorary member, and Vice-President of the club. He remarked that, though Mr. Newbigging was not a professional author, he pursued literature ardently in the intervals of an exacting profession—loving it for its own sake, and seeking no reward but the pleasure it gave him. His versatility was his most distinguishing feature, and he did all things conscientiously and well. It was proper that a gas engineer should be a "light-bearer," and this was not altogether unpoetic. Their guest had written much, and upon diverse subjects; while to the club itself he had been a constant contributor of papers—his services being recognized in 1887, when he was made a special guest at the Christmas Supper. The toast was received with musical honours. Mr. John Mortimer, in paying a tribute to their guest, informed the members that Mr. Newbigging was a Knight of the Order of the Rose—a fact which he said was not generally known. Mr. Newbigging, in reply, said one of his ambitions had been not only to be on good terms with his fellow-members, but to deserve to be so. Referring to literature, he said the pursuit of it made for youth and vivacity of spirit. It was both a solace and a delight. He then gave the members a number of personal reminiscences connected with the writing of his "History of Rossendale." The proceedings closed with "Auld Lang Syne."

GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 870.)

BUSINESS on the Stock Exchange last week was much handicapped by factors which repressed all disposition to activity, and imposed a general feeling of heaviness. Chief among these were the interminable recrudescence of the Balkan difficulty and—worse still—the alarming question as to our naval efficiency. Under these influences, operators had full inducement to lie low and await developments; and prices in general were put down. The opening was ominous on a gloomy political horizon. Home Government stocks were down—Consols falling ¼; the Foreign Market was flat on sales; others sympathized; and Railways were moreover depressed by the weather. Tuesday was shy and cautious at the start, and prices were poor. Business was impeded by the Paris telegraph strike. But before the close the situation was calmer. On Wednesday, however, the bad wind was back again; and doubts and fears both at home and abroad tumbled everything down. This state of matters lasted well into Thursday; but eventually there was a revulsion to calmer views, and some recovery set in. On Friday, the pendulum was swinging back again, and dulness was again the characteristic. Saturday was calmer, and prices were disposed to steady a bit; but business was so quiet that there was hardly any movement to speak of. It was the Committee Election day. In the Money Market, there was a good demand with little variation throughout the week, and good rates were the rule. Discount terms were firm. Business in the Gas Market was, on the whole, no improvement on the week before in point of either quantity or quality, and prices in more than one high-class line showed some shrinkage. This, however, is not to be wondered at in the general state of dulness prevalent. In Gaslight and Coke, the ordinary was fairly active; but prices were easier, though the quotation remained unchanged. The best price was 101⅜ on Monday; and the lowest, 100½ on the later days. The secured issues were steady; the preference marking from 104¼ to 105½, and the debenture from 84½ to 85½. South Metropolitan was inactive but firm. The prices marked were from 120½ to 121½. In Commercials, the 4 per cent. made 106¾ and 107, the 3½ per cent. 102, and the debenture 82½. In the Suburban and Provincial group, Brighton original made 211, British 42½ and 42⅝, Ilford 133, South Suburban preference 120¼ free, and West Ham from 113 to 114. New issues of Wandsworth and of Uxbridge stocks were advantageously disposed of at the Mart; and a quantity of Tottenham "B" was placed by tender at good figures. In the Continental companies, Imperial changed hands at from 181½ to 183, Union at 101, European fully-paid at 23⅝, and ditto part-paid at 17$\frac{13}{16}$. Among the undertakings of the remoter world, Bombay realized 5¾ and 5$\frac{7}{8}$, Buenos Ayres 13 and 13$\frac{1}{16}$, ditto debenture 95¾, Oriental 140 and 140½, Primitiva from 6$\frac{3}{16}$ to 6$\frac{7}{16}$, ditto preference from 5 to 5$\frac{5}{8}$, River Plate 14 and 14$\frac{3}{16}$, ditto debenture from 95½ to 96¼, and San Paulo 14$\frac{7}{16}$.

ELECTRICITY SUPPLY MEMORANDA.

Adversity—Revenge on the Mantle—The "Appearance" of Dearness—The Alleged Testimony of Draughty Shops and Schoolrooms—From Bad to Worse at Hastings—Private Plants v. Public Supply.

IN the electrical papers that were published ten days or so ago, it was seen that, in the week preceding, there had been much of a disquieting nature for the electricity supply world. The decision of the Finance Committee of the London County Council to refuse a loan to the Marylebone Borough Council for side street lighting by metallic filament lamps had come as a shock; and when the County Council endorsed the recommendation without a single dissentient voice—Progressive or otherwise—that was really an ignominious treatment of electricity. On top of this, the Local Government Board were seen to be in full agreement with the London County Council by their refusal of a loan for like purposes at Hastings. And then there was the report of a Departmental Committee on Poor Law Institutions, in which they averred that there was no excuse for incurring the expense in such buildings of changing over from incandescent gas lighting to electricity. Here and there, too, it was found that municipal authorities are coming to the conclusion that the time has arrived when it is inevitable that the price of electricity should be raised. Faced by this mass of condemnation of the market cry that "Electricity is Cheaper than Gas," the "Electrical Times" thought well to give vent to some of its pent-up feelings, by having a turn at the subject of the upkeep of incandescent mantles, burners, and glassware. "Meteor" dropped into some *bizarre* remarks upon the subject; their extravagance being their most ludicrous feature. Another anonymous writer "Ubique" also occupied a page of the same issue in telling electricians that the miriads of gas consumers in this country are a multitude of fools, and that they have no idea what they spend on the maintenance of their incandescent mantles. Of course, the worthy "Ubique" and "Meteor" are seemingly the only ones who really know anything about the subject. So "Ubique" sets about showing how it all works out from what he says are actual examples. But as he keeps the shops and schools he calls upon to bear witness to the truth of his assertions without any better nominal distinction

than he chooses to be known by himself, there is no opportunity of checking his statements to see if they are correct or highly coloured, or whether something cannot be done to remove some of the disgrace he essays to attach to gas lighting.

"Ubique" says that, although sometimes electric lighting may have "appeared" to be dearer than gas, yet in almost every case it has actually been cheaper when everything has been taken into consideration, even assuming the average cost of electricity as 4d. per unit and of gas 2s. 6d. per 1000 cubic feet. The "appearance" of the amount of the account for electricity, and the "appearance" of the sums paid for installation and renewals of electric lamps, have made not one but many electricity consumers return to that which prior experience assured them was cheaper, more efficient, and more reliable. According to electrical engineers, there seems to be an epidemic of personal deception abroad just now; and it does not do for the householder to believe his own senses. If his account for electricity comes to twice or three times as much as he used to pay for gas for lighting only, if the renewals of metallic filament lamps at 3s. 6d. to 4s. 6d. per point come to much more than he used to pay in a twelvemonth for two or three dozen mantles and occasional glasses, well he must not believe it is so. It is only an "appearance"—a sort of Fata Morgana. The figures the consumer puts on the cheque—always assuming, of course, he is getting the same illuminating power—may be larger for electricity, but believe "Ubique" they are not really so, they only appear to be so. Though "Ubique" has come to the conclusion that "appearance" and actuality are in this matter quite contrary things, he says "it is difficult in most cases to compare the two illuminants upon any definite basis." So we fail to see where are the reliable premises from which he draws his deductions as to the dearness of electricity being only an appearance, and as to it being cheaper than electricity.

To prove his case, the wanderer quotes some figures which he says were obtained from "an exceptionally draughty shop," and from twelve schools gas lighted and six schools electrically lighted in a certain large city. Of course, it must be a "large city" to contain eighteen schools which are themselves of no mean size, seeing that (if they have existence, and are not, like electricity accounts, merely images of the fancy) 13·3 rooms per electrically lighted school are in use for evening classes and 9·7 rooms in the gas-lighted ones. Now we suggest to "Ubique" that "exceptionally draughty shops, with the doors open all day long" are not fair places for ascertaining the cost of the up keep of mantles, nor are school-rooms where physical exercises are more heartily indulged in by the youngsters than cerebral ones, and in which metallic filament electric lamps would stand perhaps less chance than the gas mantles of escaping a violent end. Though the critic be "Ubique," it may not be known to him—touching this point as to upkeep in school-rooms—that in a certain printing-machine room off Fleet Street, it has been found that gas mantles stand the vibration of the running machinery better than metallic filaments. But in one "exceptially draughty shop," it is said that six lights only are used. Now a shop merely requiring six lights cannot be called "large;" yet with a gas account of £6 5s., the "replacement of mantle and burner repairs came to £5 3s." If "Ubique" were up for examination, we should ask him to describe those costly "burner repairs." We should also suggest to him that 17s. 2d. per burner per year for "mantles and burner repairs," is considerably more than is spent on a street lamp for such purposes at seaside places where storms rage and the wind "blows great guns." We would also submit that that shopkeeper could get a new ordinary "C" burner, mantle, and glass—the combination complete—once a month for the 17s. 2d. it is alleged he spends per burner per year; or for £5 3s. he could buy about 310 good class mantles, and feed his six burners with them during the year liberally—aye, and lavishly. Find something to talk about "Ubique" a little less extravagant. We know a house somewhat intimately in which thirty gas burners are used, mostly inverteds, and two dozen mantles were the total number purchased last year for renewals, and, like Charley's Aunt, they are still running, with three or four remaining in stock for renewal.

As to the school lighting, no information is given about the number of gas-burners, or their description. The particulars are altogether incomplete and deficient for fair judgment. But carbon filament lighting is credited with being twice as expensive as incandescent gas lighting; while on a hypothetical case gas is made out to be £20 dearer than metallic filament lamp lighting per school—that is to say, £53 as against £33. "Ubique" is humorous; he allows 2000 hours' life for metallic filament lamps in school-rooms—a life which our experience assures is not attained in places where more tranquil conditions prevail. "The mean candle power of the gas-incandescents over their whole life" [does he mean life of mantle or burner?] "was found to be between 35 and 40 by the engineer who compiled the reports from which the figures are taken." Either the engineer was an electrical man, or the burners were badly maintained if they were of a class using (say) 3 to 4 cubic feet of gas per hour. In one of the tables, we see a heading "Candle Power from Gas Arcs," and under it 35. We know of no so-called gas "arcs," giving an illuminating power of only 35 candles. Perhaps "Ubique" will inform us as to these marvellous lamps; or better still, as these are public schools, there will be no harm in him saying where they are to be found, so that independent inquiries can be instituted, in order to enable us to further criticize his article in the open and not in the dark.

The estimated deficiency of the Hastings Corporation Electricity Department for the current financial year is £4098. In the year ending March 31, 1908, it was £2982; and these are the two largest deficits since the concern has been in the hands of the Corporation. Things are therefore going from bad to worse. The case for expansion of the public lighting by electricity has been that the load at the price to be charged would be of great service to the electricity undertaking. The benefit is not reflected in the deficiency last year, nor in the estimated one for the present year. Since 1898, the aggregate of the deficits made by the concern is £12,812, to which is added "contribution *re* liability for sinking fund, &c.," £1415—making £14,227. Against these deficits there have been "surplus" profits in certain years amounting to £2888; so that the ratepayers, in addition to a costly system of public lighting by electricity, have had to render subvention to the electricity undertaking, through the rates, to the amount of £11,339. Have the ratepayers any knowledge, too, of a reserve and depreciation fund in connection with the electricity undertaking? We are afraid that the future has some financial hard times in store. The Local Government Board have refused a loan for further street electric lighting; but the Electricity Committee are sure to want to keep the pot boiling, and will, having regard to precedent, be pressing this extension scheme again before very long. When they do, and a price is named, the ratepayers, in the fullness of their experience, may say to the Committee, "Well, and how much more than that price will you be requiring from the rates?" It is clear that either the private consumers or the public lamps are not charged sufficient for their electricity; otherwise there would not be these heavy deficits. It was not long ago that a correspondent of one of the Hastings papers was questioning the logic of certain reasoning that had appeared in the "Memoranda." The question just flits across the mind as to what he thinks of that "logic" now, in the light of a deficit of £4098. Of course, if a shopkeeper continues to sell goods under a price that will allow him to discharge all his financial obligations on the business, he must expect a balance on the wrong side. But because the shopkeeper happens to be the Corporation, we fail to see why the ratepayers as a whole should make up the deficiency year after year caused by under-charging. If the electricity supply had been in the hands of a Company, the ratepayers would not have had to pay £11,339 in aid of the rates, nor would there have been so much anxiety on the part of the Corporation to have the streets electrically lighted. The Ratepayers' Association think the best thing to be done is to sell the whole affair as a "going" concern, and cut recurring losses.

In the report of the Departmental Committee appointed by the Local Government Board to investigate various matters referring to poor-law institutions (*ante*, p. 679, 700), it was suggested that, in all places where a supply of gas or electricity can be obtained from a public supply on reasonable terms, it is preferable to the installation of a private gas manufacturing or electricity generating plant. The reason for this recommendation was that, in such institutions, where the money of the ratepayers is spent, there is a tendency in many instances to over-elaboration and waste; and, in the case of electricity especially, the temptation to squander current is too great for resistance by poor-law officials and servants. But we cannot agree that the dictum in this respect of the Departmental Committee can be detached from the institutions with which they were specially dealing, and generally applied to other establishments, and especially business ones. It is thought by one of our contemporaries that, in view of the great reductions made of recent years in the prices charged for electrical energy both for lighting and power purposes, the economies expected to result from the installation of private plants must be in many cases of a doubtful character. It depends on local circumstances, and the purpose for which the electricity is required, whether or not it pays to put in a private plant, with no capital outlay on a distribution system and no upkeep other than within the four walls of the premises. It might not always pay for power, with the figures charged for inferior as well as for good loads, to put in a plant. Much depends on the load. But in the case of a large establishment requiring electricity for lighting, the prices for current from the public supply are put out of court when brought into comparison with the costs of the private plant.

How is it there are in existence so many of these private plants driven by gas both for lighting and power? In economy is found the answer. It is not because a gas undertaking finds a private electricity plant for driving the new stoking machinery dearer in whole costs than the charges by a public service for power, that they prefer the former; it is because they find it cheaper and preferable to run their own plant, and have it under their own control. Only recently in Croydon, a large shop installed its own gas-driven electricity generating set, and put aside the public supply. This was not done for the pure fun of the thing. Our contemporary who prefers the public electricity supply to the private plant, points out that the apparent saving on the cost of a supply of energy purchased from the authorized undertaking must be largely discounted by the "considerable" allowance which should be made for depreciation. The same paper was talking on the subject of depreciation in a previous issue; and, referring to the repayments of public electricity supply undertakings, incidentally remarked that for electrical machinery which is so very subject to antiquation in addition to wear and tear, even an equated term of 25 years is unduly long. Some of these public supply concerns therefore do not look after this point of depreciation with the care they clearly should do. If there is

"considerable" depreciation on private plants, there is "considerable" depreciation on the public supply plant. The Local Government Board apparently agree with our contemporary; for they have recently been mentioning the matter in various quarters. The Islington Borough Council have also come under the censure of the London County Council Finance Committee in regard to the same matter. The public supply undertakings should set a good example to owners of private plants. In another respect, as the trouble at the Hôtel Continental, Paris, recently showed, there is a similarity in the private generating plant and the public supply, in that the employee electricians can make matters very unpleasant, by seriously playing the game of "down tools."

NATIONAL PHYSICAL LABORATORY.

Last Friday afternoon, the National Physical Laboratory, at Bushy House, Teddington, was open for inspection; and a party of considerably over a hundred availed themselves of the invitation of Sir Archibald Geikie, the President of the Royal Society, and Chairman of the General Board of the Laboratory, to be present on the occasion. The Chairman received the visitors on their arrival; and then they scattered themselves amid the different departments. No doubt, in the first instance each sought the particular branch in which his chief interest lay; but in the course of the afternoon—so varied are the instruments and processes to be seen—many, if not most, of those present must have found themselves among appliances that were strange to them. Here it is that well-deserved acknowledgment may be made of the efforts of the staff, who were in attendance in full force, and were unremitting in their efforts to furnish all desired information, as well as in giving practical demonstrations with the appliances of which they have charge.

A good deal of space is devoted to photometry; but it must be remarked that most of the work at present appears to be of an electrical character. This department is in the Electrotechnics Division, at the head of which (of course, under the Director of the Laboratory, Dr. R. T. Glazebrook) is Mr. C. C. Paterson, who has done of late so much photometrical work. The Director reports that in the past twelve months careful comparisons were made between the Laboratory standard pentane lamp and other pentane lamps which were sent for testing. Some important inter-comparisons with the standards of the Metropolitan Gas Referees were also carried out through the medium of some pentane lamps ordered by the gas authorities in America. The agreement was found to be exceedingly close; the results still further substantiating the reliability of the 10-candle pentane lamp of Professor Vernon Harcourt as the primary standard of candle power. With the agreement of the Metropolitan Gas Referees, a change has been made in the definition of the standard atmospheric conditions in which the pentane lamp is taken as giving its nominal candle power; it having been decided to express candle power in terms of the pentane lamp burning in an atmosphere containing 8 litres of water vapour per cubic metre measured by the Assmann or other approved ventilated hygrometer. The change in the definition, it is pointed out, causes no alteration in the value of the candle as interpreted in the various glow lamps sent for standardization. Progress has been made in the establishment of two sets of standard lamps of a higher efficiency, and therefore of whiter light, than those commonly used for electric sub-standards. These run at 3·5 and 3·1 watts per candle respectively. Efforts are now being made to obtain satisfactory metallic filament lamps to give further steps down to 2 and 1·5 watts per candle. In this way it is hoped reliable standards may shortly be issued for use in connection with the photometry of metallic filament lamps. The establishment of these standards is being combined with an investigation of the differences obtained by several observers for varying degrees of colour difference in the light under comparison, as found by the ordinary methods of photometry. The principal addition that has in the last twelve months been made to the equipment of the photometric standards section is a 4½ metre photometer-bench, which enables high candle-power lamps to be measured at the same illumination on the screen as in the case of lower candle-power lamps. An interesting feature to electricians is to be found in the life-tests on glow lamps, for the carrying out of which extensive arrangements have been made. In order to systematize the tests on glow lamps to the Engineering Standards Committee specification, a new equipment has been designed and constructed, consisting of three life-test frames, each accommodating a hundred lamps in ten separate racks. Each of these racks can be tilted so that the lamps in it may be burnt at any desired angle. There is also the specially designed photometer by Messrs. Alexander Wright and Co., to which reference has on previous occasions been made in our pages, for dealing with lamp testing to the Engineering Standards Committee specification. This is 3½ metres long; and all candle power readings can be made direct, without using any multiplying factor or correction. The test lamps are rotated by a spinner, the speed of which can be varied so that metallic filament lamps may be slowly rotated without risk of damage.

Passing by the new 100,000 volt transformer and the numerous testing machines in the Engineering Department, all of which proved of great interest to the visitors, a pause may be made in the rooms devoted to thermometry—which branch is under the care of Dr. Harker. Here the staff have lately been occupied in the design and equipment of a subdivision for the testing of mercurial thermometers and the building of a new electric furnace room. There is a carbon spiral furnace designed by Dr. Harker and Mr. W. A. Price for work to over 2500° C. This has been employed for the determination of melting points for the standardization at high temperatures of optical pyrometers; but it will also be used for various other purposes. It is promised that an account will be published shortly of the furnace and the experiments made with it. Three permanent furnaces specially designed for the verification of radiation pyrometers are being installed in the new furnace room. They consist of brick shells covered externally with cement, and closed above by a square fire-clay slab; and they are approximately cubes of 2 feet wide. The furnaces are disposed on three sides of a square, in the centre of which is an upright steel shaft, to which is keyed a horizontal wheel 20 inches diameter, and having on its edge twelve sockets for carrying pyrometers. Thus these can in turn be brought opposite to the mouth of any particular furnace without alteration of their adjustments being necessary. In addition to the "black-body" furnaces for testing total radiation pyrometers, there is, of course, a great deal of other apparatus in these rooms. In this department, too, Mr. Blackie has lately carried out several thousand individual experiments upon the mechanical strength of fused silica after subjection for definite periods to high temperatures. In experiments to test the melting-point of fire-bricks from different makers, a specimen is cut in the form of a disc to definite dimensions, and is heated in a small vertical tube furnace by means of an electric arc, the temperatures being taken by an optical pyrometer. Great differences are, it is said, found between the melting-points of different bricks. The method described, however, is one that requires considerable care in the preparation of the samples; and it is hoped to be able to arrange for the testing of complete bricks under conditions more closely approximating to actual practice. The idea is to instal a large injector furnace with specially shaped cavity, available for temperatures up to well over 1700° C., and heated by gas and an air blast under high pressure, the temperatures of the brick being measured optically as before. In thermometry, the most important piece of research contemplated for the year is the construction of a gas thermometer for work at very high temperatures, and the determination on the gas scale, without the uncertainty of extrapolation of the melting-points of platinum and other materials melting at high temperatures.

What have been alluded to here are, of course, but one or two of the many interesting features of the work of research, maintenance of standards, and testing of instruments and materials which is carried on at the Laboratory. Some idea of what is undertaken there will be gathered from the following figures relating to tests of instruments and apparatus made last year: Electrical measurements, 300; electrotechnics, 1615; photometry, 779 (of which only 40 referred to gas-burners); thermometry, 309; metrology, 547; glass vessels and weights, 997; optics, 21; taximeters and taximeter gear boxes, 9585; engineering department, 131; metallography, 33; chemistry, 34; and observatory department, 30,722. The income rose from £17,059 in 1907 to £21,871 last year. The Council of the Institution of Civil Engineers have made a grant of £500 a year for three years, under the condition that the sum so granted should be applied for research work of utility and interest to engineers. The expenditure last year, including a sum of £1065 devoted to additional equipment, was £21,343, showing a balance on the year's working of £528. For the previous year the expenditure, including £590 on equipment, was £16,757, and the balance £302. The balance-sheet shows a total balance of £1272, as against £1012 twelve months before.

Rejection of the Proposed Gas and Electricity Tax in Germany.—The Finance Reform Commission of the Reichstag, who on Friday rejected the proposed tax on advertisements, next day treated in like manner the suggested impost on gas and electricity. People who have watched these projects declare that both had been foredoomed to death from their appearance; but no acceptable alternative scheme for raising the 4,000,000 sterling anticipated from them has yet been brought forward.

The Coking Properties of Coal.—In a recent number of the "Comptes Rendus" of the Paris Academy of Sciences, this subject was dealt with by M. Boudouard; and an abstract of the article has been given in the "Journal of the Society of Chemical Industry." Coal was treated with various organic solvents. All of these, excepting pyridine, extracted only very small quantities of brown tarry matter; but pyridine took out more than 10 per cent., and to a certain extent affected the coking power unfavourably. Strong hydrochloric acid had no action on coal; strong sulphuric and nitric acids destroyed the coking power; and oxalic acid was formed by the latter. Both fusion with potassium hydroxide and the action of Schweitzer's reagent (ammoniacal copper solution) diminished the coking power appreciably, oxalic acid being produced in the former case. The successive action of aqueous potassium hydroxide solution, hot strong hydrochloric acid, and Schweitzer's reagent, destroyed the coking power completely. The author concludes that the coking power of coals is caused by the presence of complex condensation products of carbohydrates, and that the humic acid found in non-coking coals has been formed by the oxidation of these products.

ACCOUNTS OF THE METROPOLITAN GAS COMPANIES FOR THE YEAR 1908.

—	Gaslight and Coke.	South Metropolitan.	Commercial.	All the Companies.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Capital and borrowed money (including premium capital)	27,472,192 11 9	8,325,340 0 0	2,639,341 11 9	38,436,874 3 6
Income—viz.:				
Total gas-rental	3,050,904 2 10(a)	1,368,547 11 2(d)	385,161 4 7(f)	4,804,612 18 7
Rental of meters, fittings, and stoves	269,640 7 8(b)	133,069 9 9	48,193 17 2	450,903 14 7
Residual products	892,872 11 2	563,145 3 10	104,034 19 10	1,560,052 14 10
Miscellaneous, including old materials	23,385 12 2	8,618 17 1	572 17 5	32,577 6 8
Total income from all sources	4,236,802 13 10	2,073,381 1 10	537,962 19 0	6,848,146 14 8
Expenditure—viz.:				
Coal and oil, including carriage and dues	1,462,004 4 4	815,189 16 1	211,562 18 0	2,488,756 18 5
Purifying materials, including labour	29,738 16 0	19,503 17 1	2,831 4 10	52,073 17 11
Salaries and wages—manufacture	217,839 8 4	140,068 16 2	37,526 11 5	395,434 15 11
Wear and tear—manufacture	372,505 1 3	191,811 11 6	48,289 15 4	612,606 8 1
Rents, rates, and taxes	292,604 19 5	87,614 13 1	24,754 6 8	404,973 19 2
Salaries—management	16,351 10 2	6,928 18 9	2,439 2 7	25,719 11 6
Collectors' salaries and commission	45,848 18 9	30,660 18 4	8,697 0 5	85,206 17 6
Stationery, printing, and general charges	23,705 7 11	24,559 8 5	5,384 15 5	53,649 11 9
Directors and auditors	5,904 4 0	5,514 19 9	2,650 0 0	14,069 3 9
Salaries and wages, wear and tear—distribution	238,624 7 10	99,323 10 5	25,762 6 2	363,710 4 5
Repair and renewal of meters and stoves, &c.	273,145 5 5	167,593 10 5	38,536 6 3	479,275 2 1
Law and parliamentary charges	4,061 7 0	1,919 9 7	558 11 2	6,539 7 9
Bad debts and extraordinary expenses	73,151 10 7(c)	56,759 12 6(e)	10,149 6 10(g)	140,060 9 11
Total expenditure on revenue account	3,055,485 1 0	1,647,449 2 1	419,142 5 1	5,122,076 8 2
Gross profit	1,181,317 12 10	425,931 19 9	118,820 13 11	1,726,070 6 6
Do. per cent. on capital and borrowed money	4 6 0	5 2 4	4 10 1	4 9 10
Do. do. gas-rental	38 14 4	31 2 6	30 17 0	35 18 6

(a) Including £149,516 received for public lighting and gas supplied by contract. (b) Including £57,771 rental of ordinary meters. (c) Including annuities £49,998 and £3859 on workmen's compensation account. (d) Including £34,227 for public lighting. (e) Including £13,711 paid to pensions, &c., funds, and £36,426 under the co-partnership scheme. (f) Including £11,547 for public lighting, &c., and less discounts and allowances. (g) Including £5590 paid under the profit-sharing scheme.

TABLE *showing the Capital, Income, Expenditure, and Profit per* 1000 *Cubic Feet of Gas Sold in* 1908.

—	Gaslight and Coke.	South Metropolitan.	Commercial.	All the Companies.
	s. d.	s. d.	s. d.	s. d.
Capital and borrowed money	25 0·43	13 6·42	16 10·82	20 6·84
Income—viz.:				
Total gas-rental	2 9·36	2 2·70	2 5·60	2 6·86
Rental of meters, fittings, and stoves	2·95	2·59	3·70	2·89
Residual products	9·76	10·99	8·00	10·02
Miscellaneous, including old materials	0·26	0·17	0·04	0·21
Total income from all sources	3 10·33	3 4·45	3 5·34	3 7·98
Expenditure—viz.:				
Coal and oil, including carriage and dues	1 3·99	1 3·90	1 4·26	1 3·98
Purifying materials, including labour	0·31	0·38	0·22	0·34
Salaries and wages—manufacture	2·58	2·73	2·89	2·55
Wear and tear—manufacture	4·07	3·74	3·68	3·94
Rents, rates, and taxes	3·20	1·71	1·90	2·60
Salaries—management	0·18	0·13	0·19	0·12
Collectors' salaries and commission	0·50	0·60	0·67	0·55
Stationery, printing, and general charges	0·26	0·48	0·42	0·34
Directors and auditors	0·06	0·11	0·21	0·10
Salaries and wages, wear and tear—distribution	2·61	1·94	1·98	2·34
Repair and renewal of meters and stoves, &c.	2·99	3·27	2·96	3·08
Law and parliamentary charges	0·04	0·04	0·05	0·05
Bad debts and extraordinary expenses	0·80	1·11	0·78	0·90
Total expenditure on revenue account	2 9·41	2 8·14	2 8·21	2 8·89
Gross profit	1 0·92	8·31	9·13	11·09

TABLE *showing the Increase or Decrease in each Item during* 1908 *compared with* 1907.

—	Gaslight and Coke.		South Metropolitan.		Commercial.		All the Companies.	
	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.	Inc.	Dec.
	£	£	£	£	£	£	£	£
Capital and borrowed money	..	21,045	..	..	18,407	..	..	2,638
Income—viz.:								
Total gas-rental	..	75,822	62,970	..	..	826	..	13,678
Rental of meters, fittings, and stoves	57,759	..	4,431	..	2,345	..	64,534	..
Residual products	26,346	..	..	8,566	..	2,119	15,662	..
Miscellaneous, including old materials	..	1,673	..	4,363	..	412	..	6,448
Total income from all sources	6,610	..	54,472	..	..	1,012	60,070	..
Expenditure—viz.:								
Coal and oil, including carriage and dues	81,133	..	..	159	7,671	..	88,646	..
Purifying materials, including labour	..	11,914	..	5,271	..	682	..	17,868
Salaries and wages—manufacture	..	15,074	..	6,845	..	3,010	..	24,929
Wear and tear—manufacture	..	43,107	..	835	2,271	..	..	41,672
Rents, rates, and taxes	5,432	..	2,406	..	86	..	7,924	..
Salaries—management	..	522	..	339	61	..	..	801
Collectors' salaries and commission	..	717	1,334	..	718	..	1,335	..
Stationery, printing, and general charges	1,148	..	1,084	..	..	500	1,733	..
Directors and auditors	..	..	350	..	..	..	350	..
Salaries and wages, wear and tear—distribution	5,536	..	7,805	..	..	1,992	11,349	..
Repair and renewal of meters and stoves, &c.	15,729	..	57,348	..	1,528	..	74,605	..
Law and parliamentary charges	1,713	..	..	9,023	230	..	..	7,080
Bad debts and extraordinary expenses	4,342	..	..	3,350	..	370	623	..
Total expenditure on revenue account	43,699	..	44,505	..	6,011	..	94,215	..
Gross profit	..	37,089	9,967	..	..	7,023	..	34,145

NOTES FROM WESTMINSTER.

It has not been a particularly lively week in the Committee rooms, although there appears to be a disposition to get through the work as fast as possible. The energy in this respect is more on the side of the promoters of Bills than on that of the parliamentary authorities, as, notwithstanding protestations by those in high places that the Government are going to continue in office until they have seen their social programme through, there is a feeling of great uncertainty in the air as to whether the security of the Government is as sound as their words portray. However, there has only been one Commons Committee with gas measures before it in the past week. It was the Committee sitting the previous week; but a change had been made in the Chairman—Mr. Mooney taking the place of Mr. Partington. The list of Bills under their consideration was, however, substantially reduced by agreement, and withdrawal of opposition. Hostility to the Littlehampton Gas Company's Bill was settled without an appeal to the Committee; and the Swinton and Mexborough Gas Board Bill, as the result of negotiation with the Gas Company (who are losing their concern under the purchase clause inserted in their Bill last year), did not claim any consideration from the Committee. By the way, respecting the Littlehampton Bill, this came before the Unopposed Bills Committee on Thursday; and there is no surprise that the new capital asked for was regarded as too high by Mr. Emmott and his colleagues. It has been cut down by practically one-third—*i.e.*, from £60,000 to £40,000, of which £10,000 represents the borrowing powers. The Eastbourne Corporation were satisfied over the Gas Company's Bill; and consequently the measure was only faced by hostility in respect of the supply to certain areas to which the Company proposed stretching their mains, and which are at present on the borders of their limits of supply. But though the matter was a small one, the Committee were engaged upon it during two days' sittings and a short time on the third.

The Gaslight and Coke Company's Bill was next on the list; but it was finally decided not to take it until next Thursday. There is a good display of opposition; but it is, we believe, largely a question of fighting for terms, and there is really no great depth to the hostility in respect of the amalgamation of the West Ham concern to the larger one. As a matter of fact, there is nothing much to advance against the scheme. Local sentiment cannot be taken to rank against a project that has practical and economic considerations in its favour; and if the main purpose for which a gas undertaking is founded can be better served by such a step as is here proposed, that fact must be taken into account before any other. To it all else is subservient. As will be seen by the report appearing elsewhere to-day, the London County Council, in connection with the proposed reduction of illuminating power by the Gaslight and Coke Company, have secured a standard of calorific power for the gas. It is an interesting development of the calorific power testing that has been going on "for information only," in connection with the Metropolitan Gas Supply since the London Gas Bill was passed subsequent to the inquiry by the Departmental Committee of the Board of Trade, presided over by Lord Rayleigh. The Electric Lighting Acts Amendment Bill has been introduced into the Lords again. This is the old Electricity Supply Bill of the Board of Trade which has been brought out for an annual airing since 1904. The electrical industry wants the Bill to become an Act; but hope deferred has made the heart sick, and the electrical people will not now believe that the Bill has succeeded until it is announced that it has actually received the Royal Assent. Two Lords Committees are sitting on Private Bills. In the groups of Bills with which they have to deal, there are water measures; and in one of them, there is the Heckmondwike and Liversedge Gas Bill.

A Calorific Power Standard.

Amman Valley Bill and Eaton Dropped.

That notoriously ill-fated Amman Valley Gas Company—whose parentage unkind people say has been one of its greatest drawbacks, presumably because the address of those who conceived and gave it birth is No. 99, Cannon Street—is apparently coming to an end; or rather we suppose it is going to make a new start in life under different auspices. Anyway we hope the supposition is true. The Company have erected works, but have not been able to carry on business, for the simple reason that they have not the means of connecting would-be consumers with the plant that is prepared to make gas; and the local authority decline to let the mains be laid. The persons who have been responsible for the direction of the undertaking—and they were nearly related with the promoters of the Company—introduced a Bill into Parliament mainly to get statutory powers, so that they could pursue business in defiance of the local authority. Certain others—shareholders, it is understood, in the Amman Valley Company—who considered they had had enough of those responsible for the over-capitalized and water-logged Amman Valley undertaking, sought to wipe out the past by another Bill—the Ammanford—and to re-start the concern on a better and firmer foundation. This Bill still exists; the Amman Valley one has been dropped. Some people will regret the latter move, as it was hoped to have the opportunity of bringing to view before a Parliamentary Committee a few salient features of the art and practice and results of Company promoting as conducted from 99, Cannon Street. Almost immediately after the dropping of the Bill, there was an application in the High Court for the appointment of a Receiver. The people who have been directing Amman Valley affairs from 99, Cannon Street have evidently been pushed into a tight corner from various causes; and it would seem that they are taking the only means of escape now open to them. Of course, it is known that those interested in the promotion of the Ammanford Bill have been in negotiation with the Amman Valley Directors, with the view to bring about a settlement with the least possible expense. The whole secret of the present collapse of Amman Valley affairs is, to the best of our belief, that the promoters have not been able to accept the proposals of the Committee of Shareholders; and therefore, at a recent meeting of the Directors, it was decided to abandon the Amman Valley Bill, and support the Ammanford one, in which it is proposed to buy up the Amman Valley Company. Eaton has retired from the Board, and a member of the Committee of Shareholders (Mr. E. J. Field) has been elected in his stead. Perhaps Eaton is not sorry to get quit of further responsibility in the present condition of affairs. This seems to be the state of things at present; but it is to be hoped the shareholders will not lightly relinquish their hold on those who have brought the concern to this lamentable state, until it is conclusively ascertained by proper legal inquiry that the whole of the remedies are exhausted whereby the new Company can take possession of a concern free from undue financial encumbrance. We urge upon the shareholders to exercise the greatest care and vigilance in all their acts. The appointment of a Receiver suggests indebtedness; and perhaps it may exist to an extent which is greater than meets the eye.

Eastbourne Gas Bill.

As already said, the Eastbourne Gas Bill occupied the attention of Mr. Mooney's Committee on Wednesday, Thursday, and part of Friday; and with a little amendment, the Company obtained what they wanted. It has been pointed out earlier in these notes that the Corporation of Eastbourne withdrew from opposition; and this left practically only outside authorities hostile to the territory annexing proposals of the promoters, and which proposals included the purchase of the little concern run by the Hailsham Gas Company. Mr. H. E. Jones, Mr. John Hammond, and Mr. J. S. Garrard were among those who were present in the Committee room looking after the interests of the Company. This is the time for extension of limits by gas concerns to outer areas that have a prospective business value. In this case we cannot understand the opposition of certain of the authorities to the proposals of the Eastbourne Company. Gas is cheap in Eastbourne—that is to say, cheap for a town situated on the south coast, and so circumstanced. When a Company are asking for an increase of their limits, it is quite unfair to tie them down to any immediate expenditure of capital in carrying their mains to any district, unless there is some prospect of a fair return on the outlay. But if powers are accorded, the Company obtaining them may be, in most cases, depended upon to exercise them as early as possible. Another advantage is that from a Company like that at Eastbourne, gas can be obtained by outside districts, when a remunerative business is to be done, on much more reasonable terms than from a small independent Company. Look at the Hailsham Company, for instance, charging 5s. 5d. per 1000 cubic feet! The consumers in their area of supply will benefit hugely through annexation by the Eastbourne Company. Certain parts of the proposed extended area were eliminated by the Committee from the Eastbourne Company's scheme; but the Company have carried through the Commons Committee a large extension and the other features of their projects. But a word to the outside districts that have been excised from the extension scheme. We would say to them "Be careful not to fall into the hands of small Company promoters." Heavy capitals and dear gas are ever the results. Under the Eastbourne Company, with their reasonable capital, prices for gas must be lower. We feel convinced that a mistake has been made by those opponents who are perhaps congratulating themselves on the success of their opposition; and the time will come when the other new districts, in the enjoyment of a supply of gas at a fair price, will prove the truth of what is now being written here.

Neglected Opportunities.

The lesson of the disallowing of *locus* by the Court of Referees to the Wokingham Corporation against the Yorktown and Blackwater Gas (Electric Lighting) Bill should be taken to heart by other gas concerns—company or local authority—that are supplying in unauthorized areas. The Wokingham Corporation are selling gas in a district that the Company have included in their application for extended limits of supply; but the territory in question, although supplied by the Corporation, is not within their statutory area. The Corporation had taken no steps to put themselves right in the matter until the Company moved in the promotion of the present Bill. Then the Corporation petitioned against the Company's Bill, and, some eight days after, they applied to the Local Government Board for a Provisional Order to authorize their supply in the area in question. This application for an Order could not therefore be relied upon in support of the petition. If it had been made earlier (before or when the petition was lodged), it would have given it support. But as it was, the belated application has done the Corporation no good so far as the Company's Bill is concerned. In the matter of statutory powers, especially where they are necessary to confirm action, it is better, as in other matters, not to put off till the morrow what one can do to-day. So the Wokingham Corporation are doubtless now thinking.

AN UNPUBLISHED LETTER.

The Circulation of Misstatement.

NEITHER the "Daily Mail" nor Mr. Duncan Watson has taken up the challenge thrown out by us in last week's issue to prove that electricity is cheaper than gas. There were figures sufficient in our article (based upon Mr. Duncan Watson's own) for either that gentleman or our morning contemporary to work upon, if there was anything fallacious about the reckoning or the manner of reckoning. But there has been silence in both quarters; and silence may be taken to be an admission that Mr. Duncan Watson and the "Daily Mail" are not in a position to controvert the criticism of their performances.

Nothing has been heard yet of an acceptance of the challenge made (on behalf of the Gaslight and Coke Company) by Mr. F. W. Goodenough, the Chief Inspector, nor of that of the Welsbach Company, which has been offered freely to all responsible firms and suppliers of electricity who have sufficient faith in their assertions as to electric filament lamps being cheaper lighting agents than modern gas-lamps to back them up in a practical and convincing way.

The sense of fairness seems to be asleep at the offices of the "Daily Mail." The electrician's side of the tale has been told in its columns, his statements have been accepted as true without question, but the other side of the story is carefully kept in the dark. We looked for fairer treatment by the Editor of that paper; but it seems that the responsible person on the staff shies at eating the leek. Mr. Harold E. Copp, of West Bromwich (doubtless others did the same), addressed a letter to our contemporary, pointing out the inaccurate conclusions, from data misrepresenting the true position, in the articles published by it, and offering to demonstrate the veracity of his own figures at any time by means of the most accurate instruments available. That letter has not been published by the "Daily Mail;" and the refusal is a stronger comment on the want of regard for fair play than any words of our own could be. The letter by Mr. Copp (dated March 10) to which publication was refused is as follows:—

I beg respectfully to point out that your leading article, and also that to which it referred on "Cheaper Electric Light," printed on page 4 of your issue of Monday, March 8, are calculated to produce in the minds of the public grossly inaccurate conclusions, inasmuch as evidently the best form of electric lighting is compared with an obsolete method of gas lighting—a trick which even now some electricians are not above doing.

As one who has had exceptional experience in the photometrical testing of both gas and electric light at various voltages, I have found that it is an exceedingly good metallic filament lamp at any voltage which maintains an average of 1¼ watts per candle throughout (say) 500 hours' lighting. I admit that, with a low voltage and metallic filament lamps, better results are obtained than with a high voltage; but the above figure must in any case be considered a low one. It is, of course, unfortunate that a few years ago electric lighting stations were designed for higher voltages than are now found convenient for metallic filament lamps. Hence the desire on the part of several manufacturers to supply transformers. Taking electricity at 2d. per unit, and the best metallic filament lamps, consuming about 1·25 watts per candle, a light of 100-candle power can be maintained for eight hours with the expenditure of 1 unit, costing 2d. There are numbers of inverted gas-burners, which can be purchased at from 3s. to 4s., which will give a light of 100-candle power when consuming 3½ feet per hour; and taking gas at 2s. per 1000 cubic feet, the 100 candles would be maintained for 24 hours for 2d. Or in other words, on this basis, which is probably favourable to electricity, its cost is just three times that of gas.

I am prepared to demonstrate the veracity of these figures at any time by means of the most accurate instruments available.

The trouble of misstatements and unfair comparisons getting into popular daily papers such as the "Daily Mail" is that many people who do not think much for themselves, or who are incapable of investigating the value of the comparative figures, may be misled. The danger of this does not end with the paper giving first circulation to the untruths. These are often copied—and frequently the greater the untruth the more the prominence accorded—into provincial papers; and the harm is increased. It is difficult to overtake fabrications of the kind. "Vigilant," who writes under "Flotsam and Jetsam" in the "Hastings Observer," quotes in his notes published on March 13 quite extensively from Mr. Duncan Watson's article. Some opening remarks were succeeded by the following:

When I noticed in a London daily newspaper on Monday a large headline, "Cheaper Electric Light," I naturally read with great interest the article which followed it. This article is worthy of the special attention of local ratepayers and of the Electricity Department of the Town Council; for it shows that, instead of viewing with alarm the introduction of the new lamps on the ground that they mean an immediate reduction in the quantity of current consumed and a loss of profits, people who control and manage electric light works should regard this fact with satisfaction, because, if all that is prophesied for the lamps is realized, the demand for cheap electric light must grow enormously; and it will be adopted in hundreds of houses in which gas or oil is now used.

The main point about this and the quotation from the "Daily Mail's" articles is that "Vigilant" has not been able to analyze statement and data on his own account, but he does not hesitate to present the gist of this misrepresentation to his readers for their consumption. Much the same thing has doubtless been done in other local newspapers. But "Vigilant" has assisted in spreading a false and unfair comparison—false and unfair because it does not represent incandescent gas lighting in its true light. We are wondering whether "Vigilant" will quote as extensively from our last week's criticism of Mr. Duncan Watson's article as he did from that article itself—particularly the tables. We shall see.

ANALYSIS OF SPENT OXIDE OF IRON.

By a Gas-Works Chemist.

THE interesting paper on the above subject recently read before the Manchester Junior Gas Association, by Mr. Buckley, and reported in the "JOURNAL" for March 9, p. 706, suggests the need of standardizing the methods of analyzing this simple, yet complex, substance. As comparing notes is always instructive, the following may be of interest.

For the estimation of moisture 208° Fahr. (98° C.) is a satisfactory temperature; 212° Fahr. being too high—especially with a spent material fairly rich in sulphur, containing (say) over 40 per cent. The fact that sulphur is volatilized at a lower temperature than 226° Fahr. (108° C.) the writer proved on one occasion by placing some oxide in a bulbed U-tube, and heating in an oil-bath to from 212° to 220° Fahr. (100°-105° C.). The bulb of the U-tube was not in the oil; and at the end of the test (three to four hours), a fair deposition of white crystals was obtained, which adhered to the sides of the bulb. Under the microscope, the deposition was seen to consist of sulphur and naphthalene; the latter being in considerable excess.

Whether the long drying at 98° C. for twenty-four hours is necessary, the author of the paper gives no data to prove; but I give a record of the loss in weight every hour, during four hours heating at 212° Fahr., which may be taken to prove either or both sides of the question—that is to say that 212° is too high a temperature, and that the loss is due to some sulphur; or, *per contra*, that the moisture is not readily expelled. The figures are—

	Per Cent.
After drying at 212° Fahr. for One hour, the loss was	5·50
,, ,, ,, Two hours ,, ,,	5·74
,, ,, ,, Three ,, ,, ,,	5·90
,, ,, ,, Four ,, ,, ,,	6·20

The heating was not continued longer. From other considerations, 3½ hours (as was suggested by Mr. Buckley) seems about the correct period.

With regard to driving off the last traces of carbon bisulphide from the deposited sulphur, the text-book recommendation—that the extract should be dried for so long, in a water-oven—is not really so satisfactory as it appears. If the flask and its contents are heated in the oven, as suggested, the result is too high (not mentioning the risk of ignition of the CS_2 vapour) as the sulphur in crystallizing during the driving-off of the bulk of the CS_2 appears to hold a trace of the latter in solid solution, which trace is not expelled by merely heating in the oven. If the extract is caught in a small flask—say, one holding about 200 cc. and with a neck-length of from 2 to 3 inches, actual fusion of the sulphur is necessary. If after such fusion, the flask is cooled and then weighed (the sulphur apparently being quite free from CS_2), and then further heated in an air oven for (say) three hours and weighed again, and then finally allowed to stand in the laboratory all night and reweighed in the morning, this last weighing will be found from 1 to 2½ per cent. lower than that obtained after the first fusing.

The next point is the estimation of tarry matter. For this, Mr. Greville's method is not satisfactory. The long washing necessary to remove the sulphates and sulphocyanides is very tedious; and in some cases it is impossible to obtain a clear solution on the final heating. The quantity of hydrochloric acid added previous to the addition of the oxalic, appears to have considerable influence; and it would probably help to overcome some of these difficulties if Mr. Greville would state the approximate quantities of reagents to be employed. In some cases, the final solution is greenish blue, while in others there is considerable deposition of a yellowish precipitate resembling sulphur. There is, of course, a reason for this; but the writer of these notes is not prepared to discuss it just at present. However, granting that a clear solution is obtained, the result is too low—a remark which also applies to Berger's method of oxidizing and evaporating the CS_2 extract with potassium bromide and nitric acid.

Regarding the method quoted in the paper, of heating the CS_2 extract with caustic soda solution, it may be pointed out that if the sulphur residue has been previously fused, it is soluble only with difficulty even in boiling caustic soda. This last method is probably the most satisfactory; but a really accurate and fairly quick method of differentiating between the tar and the sulphur has yet to be found.

As a result of the operation of the new Patent Act, England has benefited from foreign capital to a total amount of £312,547; and the value of the annual assessment on which local authorities will receive rates will be £17,758 per annum. Up to the present, nine patents have been revoked by the Comptroller-General.

ROUND THE WORLD—AND SOME GAS-WORKS.

By Maurice Graham.

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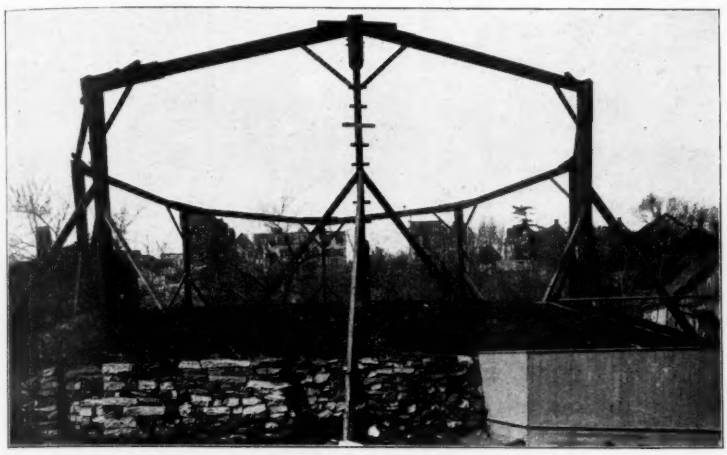
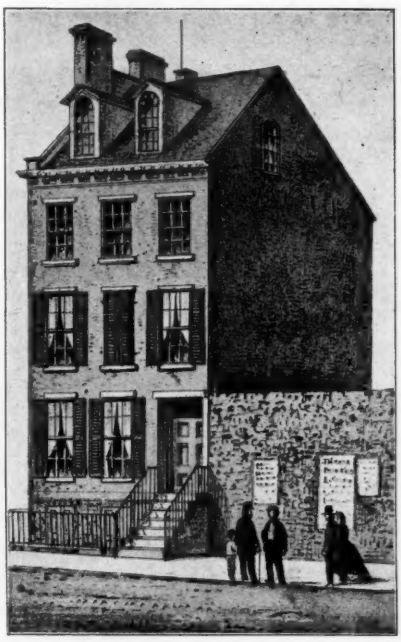
XXIV.—NEW YORK.

One night in the train from Ottawa, and New York was reached. The writer at once got into telephonic communication with Mr. W. H. Bradley, the Chief Engineer of the Consolidated Gas Company, of New York City, who had previously written a kindly welcome once more to the great city. He had further promised to give any information required for the purpose of describing, in a general way, this Company's large works without attempting any description in detail of their huge up-to-date gas plant, which is far and away ahead of any gas-works in London, especially as regards the introduction of mechanical apparatus to reduce the cost of storing and handling coal and coke. It was arranged at an interview with Mr. Bradley that a short account giving, in brief outline, the history of the present Company, would suffice, as there is not room in this last article of the series to do full justice to, or to go into details of, their splendidly designed works, the complete record of which must be left in other hands.



Photograph No. 198.—The First Gasholder Built in America.



Photograph No. 197.—The First House in New York City Lighted with Gas in 1825.

Photograph No. 199.—The First Gasholders erected at the Twenty-First Street Station of the New York Gas Company in 1847.

Early History and Amalgamations.

The Consolidated Gas Company of New York was formed in 1884 by the consolidation of the six Gas Companies then operating on Manhattan Island, which then comprised the entire city. The Companies were:—

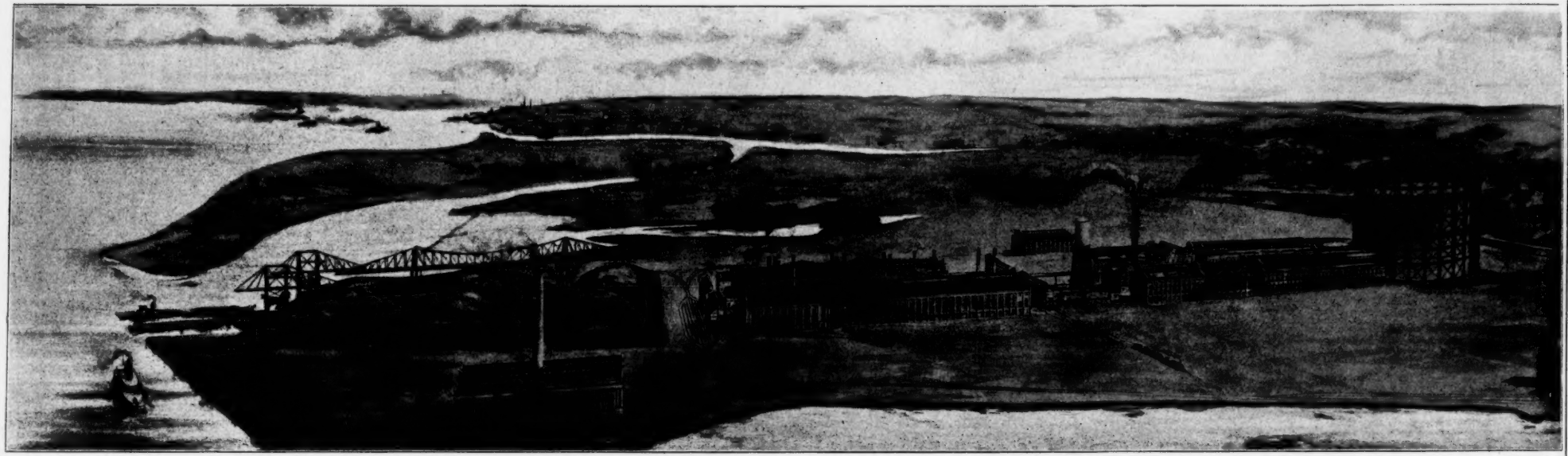
New York Gas Company, which was organized in				1823
Manhattan	,,	,,	,,	,, 1830
Metropolitan	,,	,,	,,	,, 1855
Harlem	,,	,,	,,	,, 1855
Municipal	,,	,,	,,	,, 1874
Knickerbocker	,,	,,	,,	,, 1876

Of these Companies, the four first-named supplied separate districts; while the last two were not confined to any district. The first Company—the New York—was located in what is now the lower part of the city. Gas was originally made from resin; and it is a tradition that in those early days, when an alarm of fire was given, the fire brigade went first of all to the gas-works, and, if not required there, they then searched elsewhere.

The first President of the Company was Mr. Samuel Leggett; and his house was the first lighted with gas in New York in the year 1825. An interesting reproduction of it is given in Photograph No. 197.

After some years, the gas plant was moved up-town to a more favourable site, where coal gas was made. The first gasholder built in America—or at least, the framework of it—is illustrated in Photograph No. 198; while the two holders shown in Photograph No. 199 date from 1847, and are the first two erected at the Twenty-First Street station of the New York Gas Company, when their works were moved up-town.

The Manhattan, Metropolitan, and Harlem Gas Companies also made gas from coal; but in 1880, the New York Gas Company abandoned the manufacture of coal gas, and followed the lead of the Municipal and Knickerbocker Companies, who had established water-gas plants. The former of these Companies was the first to make a commercial success of water gas in America—and probably in the world. Of the works now in operation, the Manhattan and the Metropolitan make coal gas, and the New York, the Municipal, and the Knickerbocker water gas.



Photograph No. 200.—Panoramic View of the First Coal-Gas Unit of Twenty Million Cubic Feet per Diem of the Astoria Light, Heat, and Power Company on Long Island, New York, 1906.

Besides these, there are other companies now operating or selling gas on Manhattan Island. They are the Standard Company, the Mutual Company, and the New Amsterdam Company, the last of which was formed by the absorption of the Equitable and the East River Companies. These three Companies send out water gas only, whereas the new Astoria Light, Heat, and Power Company produce coal gas exclusively. The works of the new Amsterdam Company, as also the Astoria, are located on Long Island; the gas being sent to Manhattan by a tunnel under the bed of the East River.

All the coal gas is mixed with the water gas; thus bringing it up to the legal requirement of 22 candles. The maximum total quantity sent out in a day is about 100 million cubic feet. The largest water-gas station has a producing capacity of 36 million cubic feet per day; and the largest coal-gas plant, 20 millions. The water-gas plants on Manhattan Island are of the latest design of Lowe apparatus; but the coal-gas beds of sixes and nines cannot lay claim to any special interest.

A few years after the consolidation, in 1884, of the Companies named, the question of providing for future requirements was considered; and as Manhattan Island was being too thickly built up in the immediate vicinity of the several gas-works, and as land at a reasonable cost could not be obtained, it was decided to look about for a tract of land of sufficient size to admit of laying out a comprehensive scheme of construction with a view of ultimately abandoning the manufacture of gas on Manhattan Island. In course of time, such a site was found at Lawrence Point, on Long Island. The preliminary work being done, the erection of the first unit was commenced in 1903 and was completed in 1906.

The Astoria Gas-Works.

Photograph No. 200 gives a panoramic view of the first coal-gas unit of the Astoria Light, Heat, and Power Company; its capacity being 20 million cubic feet per twenty-four hours. Moving along the spacious yard, one sees the 1000-ton barges which bring the coal to the works, and adjacent are two rapid unloaders for 250 tons per hour, which are emptying the barges and transferring the coal to the yard storage.

Between these cranes and the retort-house there travels a huge coal-handling bridge crane, 603 feet long, with a "man trolley," carrying a grab bucket of a capacity of 8 tons gross. Thus 200 tons per hour can be operated by one man controlling a storage capacity of 250,000 tons. The central feature of this unique installation is, of course, the huge grab, the spread or mouth of which is 17 ft. 6 in.—being 8 feet wide and 14 feet high. It is the largest grab bucket known to have been made. The apparatus was made by the Brown Hoisting and Machinery Company, of Cleveland, Ohio.

The electrically-driven bridge was guaranteed to lift 2000 tons in ten hours; whereas at the test it accomplished 500 tons per hour, and is now on an ordinary day doing 3000 tons in ten hours. Seeing is believing; and to see this mechanical device play with thousands of tons of coal in this manner should be an eye-opener to those large gas companies who are wasting thousands of pounds per annum by adhering to the old system of coal-trucks running round the yard and depositing the coal below, the same coal having to be again moved by hand or by crane into trucks.

The old saying that "money is made or lost in the retort-house" can now-a-days be applied to the handling of large quantities of coal and coke. Why these cantilever bridge cranes have not been generally adopted in large gas-works in Great Britain is no doubt owing to the first cost of their installation—forgetting the enormous profits resulting from the system. From the large grab-bucket the contents are dropped into a crusher and "flight conveyor," and distributed to the overhead bins; the whole apparatus being driven electrically.

The first unit of the works consists of two retort-houses, each of a rated daily productive capacity of 10 million cubic feet. One of the houses contains inclined retorts built on the pattern of the Mariendorf installation at Berlin; and in the other there are through horizontal retorts. The inclined benches are arranged in eight benches of eight beds of nine retorts each, tapered from 22¼ inches to 25 inches by 15¾ inches by 20 feet long, totalling in all to 576 retorts. They have inside generators, 7-inch diameter ascension pipes, overhead coal-bins fed by four belt conveyors, 24 inches wide, having a carrying capacity of 125 English tons per hour. The inclined retort-house is 542 feet long by 125 feet wide by 44 feet high. The horizontal house is 490 feet long, 142 feet wide, and 42 feet high. It contains six benches of ten beds of eight retorts each, or a total of 480 retorts, 22 feet long

by 26 inches by 16 inches. An ascension pipe, 8 inches diameter, is at each end of each retort. The belt conveyors feeding the overhead bunkers are 30 inches wide, and supply 160 tons of coal per hour. The charging and discharging of the retorts is done by electrically-driven machinery.

Both houses are fitted with hot-coke conveyors, also operated by electricity, into which the coke falls from the retorts, and by which it is conveyed to elevated coke-bins at each end of each house. From here it is dropped into steel railway waggons for transportation or shipment. At the works' entrance, one sees a coke loading and conveying plant with an hourly capacity of 125 tons, consisting of india-rubber belt conveyors, fixed on a movable frame, by which boats holding 400 tons are fed.

Mr. Bradley put these two designs of carbonizing plants into his new works, so as to give them a thorough test as to efficiency, and to ascertain exactly the wear and tear, &c. During the journey round the works, he gave his opinion freely to the writer that he now wishes he had built the whole lot on the inclined-retort principle, as he is getting such splendid results from the inclineds, with a minimum amount of trouble both from the plant and the men. In future, all his carbonizing extensions will be upon the inclined system. He would not venture any opinion on verticals; suffice it to say that he is satisfied with what he has at present.

Between the two retort-houses is located the separating tank for tar and ammoniacal liquor, with small storage tanks of 70,000 and 35,000 gallons. From these small tanks, the contents are pumped into the main storage tanks, of reinforced concrete, 178 feet by 85 feet by 17 feet deep, between the purifier-houses.

The gas is taken away from the retort-house by four 36-inch diameter steel mains on elevated trestles. There are no cellars or pipes underground at all; and all foundations throughout the works are of reinforced concrete and are built on the ground line. Thus all apparatus and pipe-connections sit upon concrete walls rising from the ground; and by this means everything is within sight and reach. In the exhauster-house, however, there is a slight variation, as the exhausters are raised only a trifle from the floor with the gas-mains overhead.

The gas apparatus is briefly as follows: Two condenser-houses, 76 feet by 86 feet, containing three cast-iron condensers using salt water, and three ammonia rotary scrubbers in each house, with 30-inch connections. The exhauster building is 104 feet by 57 feet, and contains five exhausters of the Root type, with directly connected engines of 58 H.P. each. Two tar-extractor houses, each 75 feet by 132 feet, cover three tar extractors, three cyanogen washers, three naphthalene washers with steam-engines, bye-product apparatus and pumps, &c., having 30-inch diameter connections. The boiler-house is 54 feet by 94 feet and has a 2000 H.P. water-tube boiler, with overhead fuel bin and bucket elevator.

There are two purifying-houses, each 300 feet by 142 feet, containing in each house twelve boxes, 40 feet by 40 feet by 8 feet deep, 30-inch connections, hydraulic centre seals with pneumatic cylinders, two cranes of 25 tons and of 47 feet span for lifting the covers. There are belt conveyors under the floor for carrying the oxide, bucket elevators for lifting it, and overhead conveyors for distributing it to the boxes at the rate of 2350 bushels per hour. The meter-house, which measures 74 feet by 54 feet, contains four station-meters, 16 feet diameter, with 30-inch connections.

Next is reached the largest gasholder in the world, having five lifts and being of 15 million cubic feet capacity. It is certainly beautifully proportioned, and is a magnificent piece of workmanship. It has a reinforced concrete tank, 300 feet diameter by 48 feet deep; and the two inlets and two outlets are 48 inches in diameter. Adjacent to the holder is a duplicate gasholder tank, ready to receive a second holder, which will probably be built this year. It will be of exactly the same size and design as the existing one.

The electrical power house is 194 feet by 106 feet, and contains four water-tube boilers of 2500 H.P., two 1000 kilowatt and one 310 kilowatt generators connected with horizontal compound engines, exciters, transformers, overhead crane of 25 tons, jet condensers, fresh and salt water pumps, and air compressors, &c. The whole apparatus is scrupulously clean, and supplies power for the gas-works.

Near by is the workshop, 155 feet by 93 feet, with mezzanine gallery, used at present for the Resident Engineers' offices, drawing offices, and others. The shop is well equipped with the latest machine tools, and is organized on the lines of the best American shop practice. It is provided with cranes for both light and heavy loads.

Throughout the works there are about five miles of standard gauge railway track, fitted with switches, turnouts, &c. There are three full-size locomotives, and twenty-five steel-bottom railway cars for carrying coal and coke and other material; each car having a capacity of 100,000 lbs. In addition, there are ten flat cars for the carriage of building materials. Ashes and other products are handled on two miles of narrow-gauge rails, on which run three locomotives. Besides the large cranes mentioned, there are three locomotive cranes to load and unload goods at the docks, which are spacious, and yet are being extended.

It will be gathered from what has been written that this short article is merely a synopsis of the plant of these large new works, which certainly impress one by the completeness, efficiency, and tidiness, which are apparent throughout.

Mr. Bradley very kindly offered the writer all or any of the photographs taken during the erection of the Astoria works; but considerations of space had not to be lost sight of. The writer is none the less indebted for permission to publish those appearing, and for information so willingly accorded.

Mr. Bradley passed his seventieth birthday in September last, and the staff found this a fitting opportunity to unveil a tablet in his honour on one of the fine buildings of the Astoria works. Having now known Mr. Bradley for many years, the writer was pleased to see him looking so hale and hearty and full of energy; and his best wishes go out to him for long-continued health and happiness.

The writer was desirous of catching the Cunard Liner *Lusitania* from New York to Liverpool; and so to finish his tour round the world with the experience of travelling home in the largest and most luxurious vessel yet built. He was greatly pleased with the result; and was particularly fortunate in finding that Mr. Jonas Drake, of Messrs. Drakes Limited, was also a passenger on the boat; so that even on board there was gas conversation and good company.

Nearing Liverpool, and being fog-bound, the writer called to mind the distance covered, the many countries, the varied climates, the strange peoples, the novel scenes, the vast cities, the isolated places, the wonders of Nature and the works of man that he had lately experienced and encountered. Within little less than fifteen months—from October, 1907, to December, 1908—he had traversed, by sea and land, by rail and river, about 55,000 miles. From London to Liverpool he had passed through the temples of Egypt, the palaces of India, and the pagodas of Burma; had viewed the growth of Australian cities and seen the possibilities of New Zealand towns; had scented the South Sea Islands and conformed to Chinese customs; had felt the fascination of Japan and the Far East, and prophesied the future of British Columbia and the West; had travelled the trail to Klondike, and appreciated the progress of Canada. His journeyings had extended from Klondike in the North, to The Bluff in the South; from Yokohama in the East, to Victoria in the West.

He had inspected about sixty gas-works of all sorts of sizes and shapes, had taken many hundreds of photographs, and had strung together, at many inconvenient times and often under uncomfortable conditions, the statistics and information obtained. For him it was the gathering up of experiences of great educative value, and had called for the exercise of powers both physical and mental. With the hope that some at home may have found something of interest in his jottings and descriptions of colleagues and of gas-works beyond the seas, the writer, with grateful feelings to those who assisted him, concludes his tour round the world and some of its gas-works.

Low-Temperature Carbonization at Plymouth.

Under the above heading, the Engineering Supplement to "The Times" last Wednesday contained an article from a correspondent giving the following particulars in regard to the installation of plant for the production of coalite at the Plymouth Gas-Works. The plant consists of three units, each 52 feet long by 13 feet wide, standing 15 feet apart. Each unit has a nominal capacity for carbonizing daily some 56 tons of coal, producing 35 tons of coalite and 280,000 cubic feet of 20-candle gas. In actual practice, these figures have been exceeded; and in weight nearer 60 tons per unit have been passed through the stills; resulting in approximately 40 tons of coalite per diem per unit. The total cost of construction has been upwards of £20,000, which, however, includes coal and coalite stores, built to be in keeping with the stone and slate-roofed retort-houses and stores of the Gas Company. The cost has been materially increased by having to fit the various parts of the new plant into already existing works, which has necessitated a considerable length of conveyor plant. Each unit consists of 32 vertical bunched stills, each bunch consisting of 12 tubes, cast into a single block. The stills are fed from above by a travelling hopper; and after a period of 3½ hours' distillation are discharged into a chamber beneath, where the contents are quenched—the solid cores of coalite falling without any assistance from above. A continuously moving conveyor, electrically driven, brings the coalite out from the quenching chamber, and distributes it where required. A small producer plant furnishes the gas for heating the stills; and so complete is the control over every portion of the apparatus that the temperature can be regulated within very narrow limits to 800° Fahr. at every point. The coalite gas as it leaves the vertical retorts passes through a hydraulic main of special construction to the condensers and exhausters; and then, after measurement, it goes forward to the scrubbers and purifiers. The whole of the blowers, fans, exhausters, conveyors, and elevators are electrically driven; the current being obtained from a couple of Peache engines and dynamos.

As already mentioned in the "JOURNAL," an International Committee has been formed to hold a festival at Zürich in celebration of Professor George Lunge's seventieth birthday on the 15th of September next; and donations are invited to a fund which will be handed over to Professor Lunge to dispose of as he may desire. It is further intended to strike a gold medal bearing his portrait in relief, and present it to him at the celebration festival.

SOUTHERN DISTRICT ASSOCIATION OF GAS ENGINEERS AND MANAGERS.

The Annual Meeting of the Association was held last Thursday, at the Hotel Cecil, Strand, W.C. There was a large muster of members. At the outset of the proceedings, Mr. NORTON H. HUMPHRYS, of Salisbury, the retiring President, occupied the chair. The President of the Institution of Gas Engineers (Mr. Thomas Glover) was unfortunately prevented from being present through indisposition caused by a chill; but the Senior Vice-President (Mr. James W. Helps) was present, as well as Mr. W. Langford, the President of the Midland Association, and Mr. C. F. Ruggles, the President of the Eastern Counties Association. Mr. R. O. Paterson, of Cheltenham, father of the incoming President (Mr. James Paterson, of Redhill), was among the visitors.

CONFIRMATION OF MINUTES.

Moved by the PRESIDENT, seconded by Mr. H. W. WOODALL (Bournemouth), the minutes of the last meeting were confirmed.

COMMITTEE'S REPORT.

On the proposition of Dr. HAROLD G. COLMAN (London), seconded by Mr. T. A. GUYATT (Ely), the report of the Committee was taken as read and adopted. It gave a *résumé* of the work of the past year—"the events and proceedings," in the words of the Committee, "testifying to the continued vitality and usefulness of the Association, and to the estimation in which it is held by a membership which covers a very wide area, and which varies numerically from year to year by very few units." Having referred to the annual meeting and the summer excursion, the following paragraph appeared:—

The next event bringing together representatives of the Association was the solemn and impressive funeral of the late Sir George Livesey, at Nunhead Cemetery. So much has been said, in sympathetic and appreciative terms, of Sir George's life and work, such full and generous testimony has been borne to his unique character, mental powers, and great services to the gas industry, that it is needless to attempt in this report to add anything further to the tributes so widely paid to his memory—the more so in view of the fact that at the autumn meeting most appropriate sentiments were expressed by the President, Mr. Charles Carpenter, and Mr. D. Irving. It will not be forgotten, however, that Sir George was to the last an active supporter of the Association, of which he had been a member during very many years. This was particularly evident in 1907, when he accompanied the members to Bournemouth and Poole upon the occasion of the summer excursion, and read a paper upon "Co-Partnership" at the autumn meeting. The Committee feel that members will all be gratified to know that the Association was adequately represented at the funeral.

Alluding to the autumn meeting, the following remarks appeared regarding the Commercial Sections:—

The discussion upon the proposed scheme of Commercial Sections, which was opened by Mr. H. C. Head (Winchester), who had prepared very useful and comprehensive notes upon the advantages of such sections, was maintained by several members, who were generally in accord with the scheme. The meeting was much indebted to Mr. T. Daxbury, the President of the Manchester Institution of Gas Engineers, who most kindly gave the members the benefit of his experience of the working of such sections in Lancashire, Cheshire, and Derbyshire. Ultimately, upon the motion of Mr. J. W. Helps, seconded by Mr. Berridge, the meeting decided to give power to the Committee to co-opt for the purpose of fuller discussion any members of the Association whose experience in this direction might be of value, and especially those who were dissatisfied with points of detail. It was then definitely proposed by Mr. H. C. Head—"That Commercial Sections be formed, in accordance with the scheme set forth in the circular letter dated Oct. 27." This was seconded by Mr. Arthur Valon, and agreed to *nem. con.* The President's announcement that Mr. J. Paterson had accepted the appointment of Hon. Organizer of the Sections was received with applause.

The report concluded as follows:—

Three names have been added to the roll of membership, three members have resigned, three have become disqualified, and three—viz., Sir George Livesey, Mr. G. R. Love, and Mr. H. J. Mitchell—have passed away; leaving a total of 164 members, as compared with 170 at the end of 1907.

The news of the decease of Mr. G. R. Love, whose recent election to the vice-presidency testified to the estimation in which he was held by the Association, was received by the President and Committee with deep regret. Gifted with practical insight and capacity for work, he set himself during some years to investigation on the working scale of the question of carbonizing in filled retorts. Needless to say, he met with disappointment. But he persevered; ultimately achieving practical and commercial success, introducing the setting of inclined retorts known as "Love's Forty-Fives," and adding to the common stock of knowledge. A man of genial disposition and high character, he was esteemed by all who knew him. The Association was represented at the funeral by the President, the President-Elect, Mr. H. Buckley (Windsor), and the Hon. Secretary.

Mr. H. J. Mitchell, of Hornsey, was a member of many years' standing; and the Committee record his loss with sincere regret.

The balance standing to the credit of the Association at the beginning of the year was £96 3s. 3d. The receipts amounted to £89 15s. 6d., and the expenditure to £90 10s. 9d.; leaving a balance of £95 8s. to carry forward. The usual copies of the "Reports of Gas Associations" were presented to members, absorbing a sum of £41 10s.

In conclusion, the Committee feel that the best thanks of the members are due to the President and the Hon. Secretary for their services to the Association during the past year.

ELECTION OF VICE-PRESIDENT.

Mr. J. W. HELPS (Croydon) proposed that Mr. C. S. Ellery be elected to the position of Vice-President. He remarked that the members knew of the somewhat unfortunate circumstances under which the Association lost their Vice-President (Mr. Love), who would in course of time have come to the presidential chair. The Committee had now asked Mr. Ellery if he would accept the position of Vice-President. He had done so, provided that the members honoured him with their confidence. He (Mr. Helps) did not think the members could do better. They all knew Mr. Ellery. He had been for a number of years before the gas world. He was President of the old Gas Institute, and was one of the best known engineers in the country. They knew how heart and soul he was in all matters appertaining to the welfare of the gas industry; and they would congratulate themselves if they got him as their President, as he would be in the course of a year or so.

Mr. H. W. WOODALL (Bournemouth), in seconding, said it was unnecessary for him to add any words. They could not possibly have a better man than Mr. Ellery to fill the position of Vice-President.

The PRESIDENT said that Mr. Ellery was in some sense a neighbour of his own; and he was sure the proposal would commend itself to all the members.

The motion was heartily agreed to.

Mr. C. S. ELLERY (Bath), in acknowledging the confidence of the members, said he would do his best in the office. He should have liked to see a younger man take it; but, as the members had been kind enough to do him the honour, he would use his best efforts for the Association.

NEW MEMBERS.

The HON. SECRETARY (Mr. A. F. Browne, of Vauxhall) read the names of the new candidates for membership, as follows: Mr. A. S. Brook, of Chard; Mr. F. J. Bancroft, of New Barnet; Mr. B. A. Carpenter, of Sheerness; Mr. W. H. Ely, of Woking; Mr. H. H. Kinneir, of Wormwood Scrubs; Mr. C. W. Offord, of Enfield; and Mr. Melville Russell, of Burgess Hill.

Mr. FRANK LIVESEY proposed, and Mr. C. F. FRANKS (Bankside) seconded, a resolution electing the gentlemen named.

The proposition was unanimously carried.

COMMERCIAL SECTIONS.

The PRESIDENT called upon Mr. Paterson to propose a resolution adopting an amended scheme for the Commercial Sections. In doing so, he observed that Mr. Paterson had been an energetic worker in this matter of the organizing of the sections.

Mr. J. PATERSON (Redhill) said he had very few words to say on the resolution. The Commercial Sections scheme, it would be remembered, came before the members last November; and the Committee were then asked to co-opt certain other members to help them in finally revising the rules. These rules had been submitted to the members with the notice of the meeting. The chief alteration, he might say, was that the proposed subscription had been revised so that for undertakings whose make was less than 50 millions per annum it would be half-a-guinea, instead of a guinea, a year. He had pleasure in formally proposing the adoption of the scheme.

Mr. H. C. HEAD (Winchester) seconded the motion; and it was at once unanimously carried.

THE NEW AND THE RETIRING PRESIDENTS.

The PRESIDENT said the time had come when, in the ordinary course of things, he must retire from the chair. He did so with a lively sense of the support he had received from the members, and the kindly courtesy and consideration his efforts had received during the year. He had great pleasure in introducing to the notice of the members his successor, Mr. James Paterson, of Redhill. When he said "introduced," this seemed superfluous, as they did not want to introduce anyone of the name of Paterson to a body of gas engineers. Mr. James Paterson was a worthy representative of one of the good old gas families who had made the gas profession what it was to-day. He (Mr. Humphrys) felt it was a great honour to have been sandwiched (so to speak) between two distinguished names; for his predecessor might also claim the dignity—that he belonged to one of the established gas families. He had pleasure in asking Mr. Paterson to take the chair.

Mr. JAMES PATERSON (Redhill) was received with applause. He said his first and very pleasing duty as President was to propose a hearty vote of thanks to Mr. Humphrys. He (the President) felt that no words of his were necessary to commend the vote. They all knew the work Mr. Humphrys had done for the Association during the past year; and those of them who were privileged to go down to his works at Salisbury carried away very pleasant recollections of their late President's work in practical gas engineering. He must ask Mr. Humphrys to take with this vote their best wishes for his health and prosperity.

Mr. C. S. ELLERY (Bath) said he had been asked to second the vote of thanks; and he was pleased to do so, because he had known Mr. Humphrys for some years, and was a near neighbour of his. He did not know how they would get on over the

Commercial Sections. He (Mr. Ellery) had had some hard knocks about it from his other neighbours. (Laughter.) He hoped, by seconding the vote of thanks, he should so please Mr. Humphrys that, when they did meet, on a sub-section being formed, he would bear in mind his (Mr. Ellery's) good feelings towards him that day, and put up with any knocks he might then give him.

The motion was cordially carried.

Mr. Humphrys, in responding, said he much appreciated the kind way in which his services had been received. He did feel he could not have got through as well as (speaking without vanity) he had done if it had not been for the cordial support he had received from the Committee during his year of office. He need not say that in Mr. Browne they had a good Secretary. Until one became President, one did not know what Mr. Browne really did for the Association. He had also been ably supported by the Committee. There had not been a Committee meeting without a full attendance. There were one or two of their old members who worked heart and soul for the good of the Association. While this happy state of things continued, they could not but go on and prosper.

Livesey Memorial Fund.

The Hon. Secretary said there was a matter to be brought before the meeting that day which was not on the *agenda;* and therefore any decision the meeting might arrive at would need, under the rules, to be confirmed at a subsequent general meeting. The Committee had been considering the question of the Livesey Memorial Fund, with the result that they recommended that a sum of 40 guineas should be contributed to the fund, subject to the confirmation of the vote at this meeting being carried by the members at the next general meeting, which would take place in the autumn, after due notice. He proposed, on behalf of the Committee, the acceptance of their recommendation.

Mr. Norton H. Humphrys seconded the proposition; remarking that it was one which commended itself to all their sympathies. So far as he was personally concerned, he was heartily in agreement with it.

The recommendation was cordially endorsed; and it will come up for confirmation at the autumn meeting.

The President then delivered the following

INAUGURAL ADDRESS.

I must first express to you, in no perfunctory spirit indeed, but with a deep sense of personal gratitude, my great appreciation of the honour you have conferred upon me in electing me to the chair. I cannot but feel that a great task lies before me in endeavouring to follow the footsteps of my predecessors; but I look confidently to the members to assist me in maintaining the usefulness of our Association.

The customary address from the chair is, I have discovered, a most difficult matter to negotiate. Our Technical Press snaps up, and serves with exemplary garnishing, all conceivable subjects of interest to us. I have decided, therefore, to confine myself to a cursory discussion of general topics from my own point of view, as perhaps, after all, members may be interested in learning their President's peculiar aspect of things. Redhill, whose Gas Company I am proud to serve, must possess a presidential atmosphere all its own, as it is only a few years ago that my predecessor there, now at Reading, occupied this chair. The district of the Company, when it was incorporated in 1865, covered close upon 100 square miles; and though some parts have been ceded to neighbouring Companies, there still remains a very large area which will doubtless in course of time yield considerable revenue to the coffers of the undertaking.

The problems of distribution have lately occupied a good deal of our consideration. We have tapped several hitherto untouched areas, and have been gratified by our success. In 1907, I brought the subject of steel tubes for mains before my Directors; and after some consideration, we laid a trial length of about 2000 yards. The jointing that is recommended is that made with lead wool; but I felt that, apart from questions of effectiveness and cost, in such joints too much reliance is placed on the individual effort of the mainlayer. I consequently decided that the old-fashioned molten lead joint was more desirable, as there could be no doubt that an adequate amount of lead went into the joint, and the conservatism of the mainlayer ensured sound setting-up. About a year after this trial length was laid, reports of leaks of gas reached me; and an occasional joint was opened, found to be leaking, and was set-up again. Still complaints came in; and a personal investigation showed that many joints were leaking—in each case at the top of the joint. The effectiveness of the first jointing could not be doubted, as several miles of cast-iron main were laid at the same time with no bad joints whatever. Our leading mainlayer, whose professional jealousy was as much aroused as mine, gave as his opinion, which I endorse, that the hot lead melted the coating of the tubes—that is, of the interior of the socket and exterior of the spigot—and carried it forward to the top, where it prevented a thorough lead-to-steel tightness. Subsequently, in my opinion, there must have been a dissolving of the coating and a consequent leakage of gas. The matter has been completely remedied by caulking the joint again, thereby distinctly driving in the lead to fill a part of the joint at the top, and running in more lead, and finally making good. I must say that, according to our experience, it is most inadvisable to use molten lead joints for these tubes; and if the above theory of our trouble is correct, I cannot see why perfectly sound joints cannot be, and indeed have been, made, where lead wool is used.

Reversing the natural order of things, let me now return to the manufacturing side of our daily work. I was in hopes that I should be able to lay before you some experiments in retort-house practice with the dry main; but, unfortunately, I have been unable to take up the subject. Members may be aware that I was brought up in the faith of the dry main; and I do not think that wild horses could convert me to anything else for the attainment of the best carbonizing results. The hydraulic main has, to my thinking, a quite unnecessary vogue; and though I admit I have introduced it into our new retort-house at Redhill, the reason is solely that I wished to preserve existing conditions until I had proved to my satisfaction the feasibility of the dry main when worked with Durham coals. I do not see any inherent reason why the dry main cannot be used with a North Country coal any less than with (say) Midland coals; and the steady, even pull of the exhauster upon the gas in the retorts attained when the liquor seal is dispensed with, must more than counterbalance any trouble that the dry main may conceivably produce.

I have also a rooted preference for built-up retorts, whether of tiles or arch bricks, such as are figured in Newbigging's "Handbook." The flexibility of the built-up retort with expansion and contraction of the setting, is, I suppose, the feature that gives it such a decided superiority over the stolid moulded retort. When a retort-setting is let-down, the cracks that appear in the moulded retort are obviously wanderers in every conceivable direction, and the retort tends to split up into irregular pieces, which have an uncomfortable knack of falling away at inconvenient times. With the built-up retort, on the other hand, all that can happen when a setting is put out of action is that each joint between the tiles opens, in regular arrangement, and it is unusual for such an event as a fractured tile to occur. The joints of the retort are pointed-up again with fire-clay before starting, and the retort is perfectly gas-tight, and literally as good as new, a few hours after the first charge goes in. There is a slight loss of gas at first, until the joints are "carboned-up;" but in two to three hours this is complete, and the retort is again started on its daily round. If the retort is used with machine stoking, the bottom tiles get cut in the course of time by the charger runners, and all that is necessary to be done is to cut out the worn tiles, and replace them by new ones. It must be admitted that built-up retorts may be a little more costly in first outlay than moulded ones; but, on the other hand, their life is much longer, and I recently heard of a setting of brick retorts, worked with a West's manual charger, which had been in use, season by season, for over sixteen years. Its brethren on either side had not worked quite so long; but they had lived at least to a respectable age, and I doubt if such tenacity of existence could be shown by the best-made and most carefully used moulded retorts.

Our condenser at Redhill consists of a long length of 10-inch pipe running round the inside of the purifier-house, and doubling-back again to the exhauster-house. This main falls continually back to the starting point; and whether the designer worked meaningly, or without design, he certainly produced the best arrangement for preserving in the gas as much of the light oils originally produced as it could carry. The result is that, as Dr. Colman has told me, although we make as much naphthalene as other works where constant trouble is experienced, we never get deposits of this objectionable hydrocarbon either in the works or district, owing to the simultaneous condensation out of the gas of its handiest solvents.

With regard to carburetted water gas, I should like to signify my complete approval of this useful ally of the older product. Its advantages have been well described and advocated by others; and its utility has been well proved during the recent mild season, when coke has been almost a drug on the market. The old suspicion against carburetted water gas is dying down. In these days of the abolition of the sulphur clauses, water gas is useful in diluting town gas that might otherwise contain 30 to 40 grains of sulphur compounds per 100 cubic feet, though, as we well know, this is not in the least harmful. Soon after taking up my duties at Redhill, I was able to secure from the Board of Trade an alteration of the form of return in the annual parliamentary papers of the amount of carburetted water gas produced. The old figure required was: "The number of cubic feet of water gas supplied." I pointed out to the Board that it was impossible to give this, as the only figure obtainable was the amount produced. I felt that as long as there was a danger of a percentage amount being worked out from these returns, and brandished as a danger signal, it was advisable to reduce this figure to a logical one—that is, a percentage of carburetted water gas made on the total make—and thereby avoid a percentage based on the total carburetted water gas made calculated on the total amount of gas supplied. This alteration was accordingly made in 1904.

I find it difficult, in a comparatively small works like ours, to properly allocate the expenses as between coal gas and water gas. The real bone of contention lies in the wear and tear, or general expenses account. Those definitely incurred in respect of each gas are easily noted; but the difficulty comes in with regard to the general and rather indefinite yard work. I mean by these, the repairing of a footpath, renewal of a fence, and the larger general repairs and maintenance which certainly form part of the upkeep of a gas-works. I endeavour to allocate these to a general repair account, and in making analyses of comparative costs, divide

between the two gases in the proportion of the respective amounts made. There is nothing more useful, and, indeed, more necessary, for a gas manager, than a careful analysis of a year's or half-year's revenue account, calculated per 1000 cubic feet on the total amount of gas sold, not made, of the total manufacturing and distribution costs. Coal and gas oil, if used, should be taken, the total obtained from residuals deducted therefrom, and the remaining manufacturing and distribution charges added to this net amount. The figures thus obtained are of inestimable use and instruction.

The testing of gas-meters seems to me to be on rather an unsatisfactory basis. The statutory test for accuracy, as you know, prescribes a testing-pressure of 5-10ths of an inch, whereas nowadays the usual district pressure is more nearly 20-10ths. In Redhill, we test all meters before sending out for fixing, whether new or old, and we find that a meter that is accurate at the statutory pressure is often near the limits at the latter pressure. For our own satisfaction, we always make our tests at this latter pressure, as, after all, this is more nearly the pressure at which the meters work. We have a suspicion, which is to some extent borne out by test, that a good deal of the gas consumed by bye-passes, if there are not many off one meter, passes the meter unrecorded.

Referring, again, to district mains, we had a mishap in Redhill some few years ago, which anticipated to some extent in detail the explosion in Bermondsey last December, but, happily, on a very different scale, and without any fatal result. The vagaries of escaping gas were in this case so remarkable that a recital of the occurrence and of its subsequent elucidation may be of interest. One of the roads in our district contains two gas-mains—that on the one side belonging to us, and that on the other to a neighbouring Company. On one side of the road is a so-called ventilator public lamp, which acts as a ventilator to the main sewer, and is in direct communication with it. One evening a report came to the works that an explosion had occurred in this road, causing a manhole cover to be blown into the air; a gaseous mixture having evidently been fired by the lamp, which had been lighted up just a little time before. The cover was replaced, the lamp extinguished, and an examination was at once commenced. A strong smell of gas was noticed at each manhole in this road, and particularly at one lower down the road, about 120 yards distant from the lamp. It was easy, on carefully ventilating the manhole, to see from which direction the gas was coming by stopping up either opening of the sewer; and it was discovered that the gas, which was undoubtedly town gas, came from the lower opening—*i.e.*, the opening further removed from the direction of the explosion.

The two Gas Companies then proceeded to examine, and subsequently to strip, their respective mains for some distance each side of the manhole, to detect what was obviously rather a large leak. The result of this examination, to our disgust, was entirely negative. Not only were the mains quite sound, but there was no sign of discolored soil in the neighbourhood. I then thought it advisable to ascertain how and where the gas was actually entering the sewer, and, accordingly, pulled a temporary stopper through the sewer to endeavour to locate the part where the gas entered the joints. To our surprise, this part was located in the last 12 inches, quite close to the manhole where the stopper was being manipulated. The Borough Surveyor thereupon sanctioned an opening of the ground at this point; and about 3 feet below the surface, we came across some disused land drain pipes, which had obviously been cut across when the sewer was laid. These pipes were full of a gaseous mixture; but there was no direct communication between them and the sewer, some 11 feet below the surface of the road. The land drain crossed the road, and lay over—but, again, not in contact with—the surface-water drain at the side of the road. This drain we found to be full of gas, and we were obviously on the right track. The drain was followed up, and finally we found, at a point exactly opposite the exploded manhole, a fractured gas-main. How the gas, instead of diffusing itself through a few inches of road covering, worked into the surface-water drain, crept downhill, crossed into the old land drains, and burrowed still further into the sewer, is a proposition I have never solved. Let therefore this rather lengthy description stand as an addition to the list of the wanderings of gas that has gone astray.

Gas undertakings are nowadays coming more and more into fiercer competition with the claims of other purveyors of power. The strong attack that the suction producer makes is embittered by the fact that it requires a gas-engine for its utilization—a source of motive power that we once thought was ours alone. It is interesting to note by the way that it seems to be invariably necessary for the user of suction producer gas to require town gas to be always ready "on tap." Whether this step of prudence is recommended by the makers of the plant, or whether the occupier knows a reliable article when he sees it, and "sees that he gets it," I do not know. Nevertheless, it behoves us to see in what way we can meet this serious competition. Many attempts have been made to estimate the actual cost of gas supplied to the power consumer, taking the particular case when his supply is a day-load; but to my thinking, such exercises cannot give a result far removed from the cost of town gas generally. Manufacturing expenses remain the same, distribution expenses—except for the difference between the maintenance of one service and of a number of smaller services producing the same consumption—cannot be much lower, and the cost of management, unless the power consumers generally begin to bulk largely, is not to any material degree affected. Some small saving is shown in the cost of collection, and that is practically all. The only real advantage to be claimed is that the new capital outlay to provide the increased producing capacity can probably be set down at a lower figure per 1000 cubic feet sold than is the cost of existing capital charges. This, doubtless, with some companies allows of a considerable reduction in the price to be charged to new customers. But the question at once arises, if to one, why not to all? What is there about the power consumer that allows him to obtain at once a lower rate, which is denied to the ordinary lighting consumer, who must cast in his lot with the already existing consumers of the undertaking?

I think the secret of the struggling of the gas manager to justify his policy towards the power consumer—which policy, I hasten to say, is endorsed by its adoption by boards of directors and gas committees—lies in the innate tendency to commercial competition which is beginning to actuate the operations of gas undertakings. Putting this idea into definite form, gas used for power purposes is in competition with other products, and must compete for its very life at competitive terms. Gas companies were originally formed to supply a commodity to produce light; and though from its earliest days gas was competing with already existing sources of artificial light, its convenience gave it a preponderating advantage. In these days gas meets with far more strenuous competition in the power field; and, therefore, let us boldly take our standpoint and sell gas for power purposes at competitive rates. This is an attitude that requires to be carefully safeguarded, to prevent any injustice to the lighting consumers. There is certainly a limit below which power gas cannot be sold; and this must be determined for each particular undertaking, taking the total cost of making and supplying gas per 1000 cubic feet, and adding a small, but adequate, amount to cover the cost of additional plant. Mr. T. Duxbury recently said that gas at 2s. per 1000 cubic feet should be in no fear of being ousted by producer gas, taking quality for quality; and this probably for most gas undertakings represents the minimum figure. Those undertakings, therefore, selling gas at this price should be well equipped for all competition from this enemy, without making any special power-gas rates.

The insidious attack of the electric motor, with its undoubted claim for simplicity in operation—provided everything is all right—and with current supplied at 1d. or thereabouts per unit, stands in a somewhat different position. The attack is obviously based on competitive terms. But at what a cost! A scrutiny of the accounts of electricity undertakings, which are from time to time instructively reviewed in certain well-known "Electricity Supply Memoranda," tells us that the central station engineer is trying to obtain custom at a price for current below the cost of manufacturing—a proceeding which has only one conceivable outcome. The operation of this desperate bid for business is already showing its inevitable result; and we must read therefrom the futility and iniquity to existing customers, of such methods.

The field of gas for heating can be considered from a similar standpoint. Gas-fires are of the utmost value and economy to the consumer for occasional and intermittent use; but it is admitted that for continuous use a gas-stove is, with gas at ordinary prices, more expensive than a coal-fire. The other advantages of a gas-fire—such as convenience, regulation of heat, and so on—are not affected by this. But the point I wish to emphasize is that gas, in competing with coal on these terms, is handicapped unless it is supplied for heating at a lower price than for lighting purposes. If gas undertakings are to enter fully into possession of the almost boundless area of supply of artificial heat to the community at large, they must be equipped with power to establish themselves; and they must be prepared to meet their competitors in this field in the same way that I have tried to show is necessary in the power field.

The dream of the scientist, of supplying gas to the whole country by distributing from huge gas-works at the pit-head, must be supplanted by the more practicable, and certainly more probable, scheme of supplying each community from its local gas-works with all artificial light, heat, and power, at practically what are now called power-gas prices only. The ultimate replacing of all coal-gas fires for heating, and all coal-ranges for cooking, by economically-designed gas heating and cooking stoves, should, I think, be our aim and goal. The perfect gas-fire has hardly yet put in its appearance, but even if it is to be found somewhere in the makers' lists, its perfection cannot be said to have unmistakably asserted itself. The present tendency seems to be to extract as much as possible of the heat produced by the combustion of the gas, and to distribute it in the room. This certainly, on the face of it, appears to be the ideal desideratum; but there are, to my thinking, important modifying factors that must not be ignored. Some of the heat must necessarily go up the chimney to produce the proper up-cast. Besides the heat which is radiated directly into the room, there is a large amount of convected heat, which is taken up by the air in contact with the hot case of the stove, or is even specially collected by placing passages through the spaces at the back. Now the circulation of this convected heat—briefly described as hot air—while undoubtedly making as much as possible of the gas consumed by the fire, gives rise to a sensation that is described as "stuffiness." Mere man is frequently unconscious of this discomfort. But the same cannot be said of his "better half;" and the objection that so many ladies have to the use of gas-fires may, in my experience, be traced to the convected

air effect. The placing of the fire in a recessed fire-place obviates, provided the chimney draught is working properly, the circulation in the room of the convected heat; so that the only heat which is allowed to be effective is the radiant heat. This state of affairs limits the efficiency of gas when burnt in a gas-fire; so that the perfect gas heating-stove must develop to the fullest extent radiant heat, and must avoid, as far as possible, the production of convected heat.

Another point to which sufficient attention is frequently not given, is the provision of an adequate hood or canopy, in front of the fire, to prevent the escape into the room of the products of combustion. However harmless these products may be, they are none the less objectionable; and their egress into a room should be prevented by whatever sacrifice of artistic appearance. The limitation in efficiency called for by the avoidance of convected heat places the gas-fire certainly at some disadvantage; but until such practice obtains generally, we shall not get a universal adherence to the use of gas-fires.

The temptation to the use of convected heat is great, as it is perhaps the cheapest form of artificial heating. The small consumption of gas by the latest forms of radiators—a rather inappropriate name, by the way—whether they are constructed to use steam vapour or not, is a strong argument in favour of their recommendation. But it must not be forgotten that their great efficiency depends upon the formation of large quantities of convected heat, which, though economical for the gas consumer, is not the best heat for a living room. The cheapness of convected heat is well realized by the architects of school-rooms and large public buildings, in their use of hot-water pipes and registers; but the constant occupants of rooms heated by these devices are not living under the best physiological conditions.

Leaving these matters of more direct application to our daily work, let me turn to a subject that is of the greatest interest to all of us—that of the training of the young engineer. The engineer who has had the responsibility of a pupil knows better than those who have not had such a charge, what difficulties lie in the way of framing a scheme of instruction and precept which is to be adequate in fully equipping the novice in the world of gas managership. In passing, let me emphasize the fact that the competent gas company's manager must be first a technician, a master-engineer, before he can aspire to the control of the functions of a gas undertaking in their entirety; while many a man can be a first class constructional engineer, an excellent carbonizer, without being fully equipped for the larger outlook and the commercial acuteness which the managing head of a gas undertaking must show and practise. And I think that, however cautiously and tentatively, the beginner should be shown the nature of the battle with the outside world which he may some day have to wage, the turmoil of which does not disturb the calm regularity of carbonizing in the retort-house, nor interfere with (say) the construction of a new purifier-house. It may be argued that it is only a proportion of the learners of to-day who become the chiefs of to-morrow; but as we cannot differentiate now, the training for all must be the same.

Harking-back to the early stages of training, the beginner should, in addition to a good general education, have some knowledge of chemistry, physics, and mechanics. Chemistry should include organic chemistry, or, as it is more correctly defined, the chemistry of the carbon compounds and their derivatives. There has been much debate as to the position in the beginner's career that practical experience in the workshop should take. My own view, which, it must be remembered, is largely influenced necessarily by my own experience, is that the workshop training should follow the school course. Then should come pupilage in a gas-works, preceded, if possible and feasible, by a technical college or university course in engineering. The debatable part of the career is certainly that preceding pupilage; for, after the latter commences, the remainder of the training is conducted along well recognized and familiar lines.

The kind of mechanical training which seems to me to be the best, is that obtained in a general engineering works, with a course in the drawing office and a good spell at the bench and lathe, following finally by actual erection of plant, apparatus, and buildings. Such an engineering works need not, of course, necessarily be either entirely or in part engaged in producing gas-works apparatus. The whole object of this part of the training is to make an engineer who can use his hands, who knows the use and value of tools, and who learns thereby self-reliance and human nature, both his own and that of his fellows.

The young engineer may be learning nothing of gas manufacture; but he is being educated. This latter word brings to mind a whole pitiful series of mistakes that seem to be in process of making in these days. Education, we quite forget, means "leading out," bringing out the innate qualities of a man—nursing, expanding, and building them up. Nowadays education is often imagined to be the stuffing of a receptive mind and memory with an endless series of facts, figures, and data, thereby the better to pass a memory test, or show superior mental agility. The encomiums bestowed on the self-made man, the home-made engineer, the George Stevensons of the world, are simply a tribute to the man who, not in spite of, but because of, education, in the original sense of the word, has succeeded in developing those qualities which are nowhere better exemplified than in the "Lives of the Engineers." In the workshop the young engineer learns, besides manual dexterity, the qualities of the men he may some day lead. He may learn things which, if he is wise, he will put away from him at once; but as he has to "go through the mill" sooner or later, let him do so when he is young and has recuperative and resisting power.

The next stage in the ideal scheme, as I conceive it, should be a course at a technical college, where the practical work is in the background, and the theoretical and scholastic work is taken up again. To this the student brings a mind sharpened by contact with the outside world; and if it is not heresy to suggest it, he may prevent the almost unavoidable stagnation of the university lecturer or professor. It has been said, I know not by whom, that the ideal university lecturer in an applied subject is one who has a constant daily business touch with a practising profession. I know that this much-to-be-desired qualification is difficult to attain; but it is certain that a class of students who have already had practical experience in an engineering works would automatically react on the teaching staff, and stimulate them to the best methods for their further education. The college or university is the place where, if possible, the student in gas engineering may first come in contact with his own specialized branch. This is rather reversing the ideal order; but some compromise must be made to convenience. Opportunities now exist in several centres for a thorough grounding in the theory of gas manufacture and distribution; and the study of this may well precede the pupilage which is soon to be entered on. I have endeavoured to sketch here what is perhaps a counsel of perfection; but the framework at least of this scheme must be found in any system devised for the preparation of the future gas engineer and manager.

Let me now turn, in conclusion, to a matter which has occupied a good deal of my attention during the last few months—namely, the proposed Commercial Section of our Association. I do not wish to propound lengthily on the subject; but I feel that if I review my own train of thought, which has culminated in my present position as Organizer of the Section, I shall perhaps enlist the support of some who possibly do not at present see the advantages, and indeed the necessity, of this new venture. My youthful idea of the functions of a gas company was that it was first a dividend-producing machine; secondly, that it offered an inestimable product to such of the public as chose to humbly beg to become consumers; and, thirdly, that any such common and vulgar performance as touting for business was absolutely *infra dignitate*, and cast a stigma upon the Company and its officers. Now I may have been wrong, and may have misunderstood the facts; but I cannot help thinking that in the old days the policy of *laissez faire* was rather the rule than the exception. Too much reliance was placed upon the "goodwill" of the concern for obtaining new business, or even retaining the old. The advent of the electric light brought clearly home to us the necessity for emphasizing the superior advantages of gas; and, beginning with gas exhibitions, designed to educate the public and to demonstrate the manifold ways in which gas may be used, we have steadily progressed and parted from the old almost contemptuous indifference, until we reach the present day, when the undertakings which are operating against strenuous competition make use of every conceivable advertising method for improving and solidifying their custom.

Now the primary object of the Commercial Section is to foster ready interchange of information, and to obtain the undoubted advantages of co-operation. The mutual benefits derived by the exchange of prices and stocks of residuals have indisputably been proved in other parts of the country. But this is only part of the story; and the overwhelming front that gas companies will present when they are banded together against the common foe, will, I hope and believe, soon be realized in our section.

I should like to take this opportunity of asking members to emphasize this "New Commercialism"* before their Boards and Committees, because I feel certain that once able business men have realized the advantages of co-operation, there will be no hesitation in coming into line. Our friend and mentor "THE JOURNAL OF GAS LIGHTING," with gentle sarcasm, referred recently to the awakening of "even" the Southern District Association to the new adhesive movement; and it is "up to us," as the Americans say, to make that good.

One word more—and a bold one, but explanatory. There is sometimes a lurking, although quite good-natured, suspicion abroad that our professional gatherings, even if they tend to the advancement and interchange of technical information and ideas, are but thinly veiled opportunities for mild jollification. I think the record of our proceedings year by year, not only of our own Association, but of others throughout the country, is sufficient proof of the solid contribution of novel, original, and useful ideas, and of instructive and stimulating discussions, which are of immense use to the industry we serve.

Now the periodical meetings of the Commercial Sub-Sections will go even beyond the technique of our profession. The work that will be carried on will be directly applicable to the commercial, the business, side of our daily work. It will be shop-keeping pure and simple. The members who attend the meetings will not be there as engineers, as technicians, to discuss novel gas-holder designs and so on, but as the buyers and sellers of the undertakings they represent. Consequently, membership of the section will not be in respect of the member, but in respect of the undertaking, which will benefit directly by its membership. It was my great privilege to be present last year at an ordinary

* See "JOURNAL," Nov. 10 last, p. 393.

monthly meeting of the Lancashire Commercial Section of the Manchester Institution; and I still retain a vivid recollection of the earnestness and directness of the businesslike proceedings under the able direction of Mr. Meunier, of Stockport.

In conclusion, I thank you for your patient attention to a somewhat rambling and discursive address, and let me plead your kind indulgence for the egotistical manner in which it has been framed.

At the close of the address,

Mr. A. E. Broadberry (Tottenham) proposed a vote of thanks to the President for his address. In doing so, he said that, as a Past-President, he could well imagine such an address as this had cost Mr. Paterson a great many hours of careful thought. Their President had commenced his year of office well, and had given them a great deal to think about.

Mr. Douglas H. Helps, in seconding, said they all knew Mr. Paterson as not only a practical gas engineer and carbonizer, but they recognized, after listening to his address, that the whole of his work did not take place in his office or on his works. The vast amount of topic he had covered in the address showed that he gave a great deal of thought to these matters when at home. He knew Mr. Paterson's works well; and he knew the good work he was doing there.

The motion was carried by acclamation.

The President, in replying, asked the members to accept his grateful thanks for their kind reception of his address. The preparation of a presidential address was not a privilege that came frequently to any of them; but he had found that the work of preparation of remarks from the presidential chair was fraught with the greatest interest and enjoyment.

More Honoured in the Breach than the Observance.

The Hon. Secretary remarked that Rule 14 of the Association had in the past been more honoured in its breach than in its observance. It stated that new members should be formally introduced by the Chairman after being elected, that their names should be entered in the roll-book of the Association, and that they should at the same time receive a copy of the regulations. This was a useful rule. In joining a new Association, a man, though he had one or two friends and sponsors, was inevitably at first amid somewhat strange surroundings; and he (Mr. Browne) thought that the rule would go very far to make the new members feel more at home.

Upon this, the names of the new members were called over; but only two responded—Mr. Bancroft and Mr. Kinneir—and these gentlemen were formally introduced by the President.

This concluded the proceedings.

ANNUAL DINNER.

The annual dinner was held in the evening; the President being in the chair, with the Senior Vice-President of the Institution to his right-hand side and Mr. R. O. Paterson to his left-hand side. After dinner, the loyal toasts were honoured; and Mr. R. O. Paterson then proposed "The Southern District Association of Gas Engineers and Managers." In the course of his remarks, he said he was glad to know that his son had so conducted himself that his fellow-members had done him the honour of placing him in the presidential chair. He thought the future usefulness of these Associations would be largely in the hands of young men. There was, in his opinion, an anxious time before those upon whom the work of the industry fell; and it was pleasing and encouraging to see the young men so enthusiastic about their work. There was plenty of scope for research by the younger men of the profession. He would suggest one subject. With the abolition of lime purification, one of the points that should be taken up by them was the relationship of CO_2 to the temperature of carbonization. He had in this connection obtained some very discrepant results. He believed there was a great deal to be done in the "New Gas Commercialism," and that gas men would have to live a strenuous life during the next few years. The President, among his remarks in reply, said as to the "New Gas Commercialism," they hardly knew where it was going to end. He believed in future it would be their policy to do maintenance free of charge—that was to say, it would have to be paid for in the price of gas, just as the prepayment consumer paid for the hire of his fittings in the price charged. "The Past-Presidents and the Committee" was a toast in the hands of Dr. Harold G. Colman; and it was replied to by the ex-President (Mr. Norton H. Humphrys). The President proposed the "Institution of Gas Engineers and Kindred Associations." In the absence of Mr. Glover, Mr. J. W. Helps (Senior Vice-President of the Institution) replied. Among other observations, he expressed the sympathy of himself and those present with the President of the Institution in his temporary indisposition. He also adverted to the work of the Institution during the year, remarking that he thought the Council had done some good for the industry at large in connection with the model contract clauses. Although all might not agree with everything that had been done in this direction, he was sure it was a step in the right direction. Mr. W. Langford, responding for Kindred Associations, said he thought it would be a good thing if the Institution would suggest subjects for the consideration of the District Associations. Mr. James L. Chapman proposed "The Honorary Secretary;" and Mr. Browne made reply, mentioning among other things that the Committee had heard from the President that day that his Directors were inviting the Association to Redhill for their summer excursion. "The Visitors" was proposed by Mr. A. E. Broadberry, and responded to by Mr. Liberty and Mr. Webber. Between the speeches, the entertainment, composed of songs (humorous and otherwise) and character sketches, was of high-class order, and gave considerable enjoyment.

The "Commercial Section" Rules.

The following are the revised rules for the Commercial Section of the Association, as agreed to at the meeting:—

(1) Membership of the Commercial Section shall be open to any gas undertaking whose engineer and manager is a member of the Association, on payment to the Hon. Treasurer of the Association of the sum of 10s. 6d. in the case of undertakings whose make is below 50 million cubic feet per annum, and £1 1s. in the case of undertakings whose make is above 50 million cubic feet per annum, upon registration, and subsequently upon the 1st of October in every year.

(2) The accounts of the Commercial Section shall be kept separately from those of the Association; and a balance-sheet to the 30th of September, duly audited, shall be submitted to the Committee every year.

(3) For the purposes of the Section the official representative of each gas undertaking may be accompanied at any meeting of his local Sub-Section by an official of such undertaking whose knowledge of the subject under discussion would be likely to benefit the meeting, who shall not, however, be entitled to vote.

(4) Sub-Sections will be formed in various centres, each having a local Secretary, who shall collect and prepare information and forward summarized reports to the other Sub-Sections and to the Committee of the Association, and shall also submit to the latter an annual report of proceedings.

(5) The general objects of the Section will be the interchange of information respecting purchase of coal, &c., sale of coke, tar, sulphate, &c., co-operation in advertising and canvassing, and common action for the advancement of the industry.

(6) The control of the whole organization, of its Sub-Sections, officers, finances, and operations, shall be vested in the Executive Committee of the Association, who shall be competent to discontinue and wind-up the Section, whether as a whole or in part, upon the 30th of September in any year, after notice given at the preceding November general meeting of members, if its continued existence shall be found incompatible with the best interests of the Association. Each Sub-Section shall appoint its own officers, whose appointments shall be subject to the approval of the Committee.

Laying Mains on Suspension Bridges.

A recent number of the "Génie Civil" contained some particulars of a simple and inexpensive device for laying a main on the Triel suspension bridge, which crosses the Seine a few miles below Paris. The bridge consists of a central bay, 270 feet long, and two half bays, each 135 feet long. Since 1905, a gas-main has been suspended on the side of the structure. It is formed of galvanized sheet-iron pipes, 6 inches diameter, in 12 feet sections; their ends being furnished with small steel ferrules, joined with Gibaut universal sleeves. Each section rests on two elongated half collars about 7 feet apart. They are made of round iron, and riveted in U-iron brackets forming a swan-neck. These brackets, which have a span of about 3 ft. 3 in., are secured by wood screws to the ends of two out of every three girders. Thus the joints have plenty of room, and the pipe lies, as it were, in a swing. The vertical play between the top of the pipe and the under part of the bracket allows the latter to leave the pipe for about 3 inches without entraining it in this movement. Since the laying of this main, which forms part of the ordinary distributing system, there has been no leakage of any consequence. This type of main can be easily placed in position, as was done at Triel, with movable scaffolding, similar to that used by painters.

Konstam's Rating Appeals.—We have received from Messrs. Butterworth and Co. "Reports of Rating Appeals" heard before the London and other Quarter Sessions, the King's Bench Division, the Court of Appeal, and the House of Lords, from 1904 to 1908. They are contained in two volumes, by Mr. E. M. Konstam, of the Inner Temple, Joint Editor of "Ryde and Konstam's Rating Appeals, 1894—1904," of which the present volumes are a continuation. Opportunity may be taken of noticing the books more fully in a subsequent issue. Meanwhile, it may be mentioned that the price of each is 12s. 6d. net.

The Industrial Aspect of the Daylight Saving Bill.—A correspondent, in a communication to the Engineering Supplement to "The Times," points out that the industrial aspect of the Daylight Saving Bill appears to have been overlooked entirely. It was stated in advocating the Bill that the saving in lighting to the railway companies alone would amount to £60,000 per annum, and that the national saving on this score would run into millions. The writer remarks that in the present state of depression this is a disastrous way of regarding the matter. These millions represent in the first instance so much dividend lost to shareholders in gas and electricity companies, and an additional burden to the ratepayers in communities where these undertakings are municipal. In addition, there is the loss to the manufacturer of the machinery, to the shopkeeper who sells it, and also the loss in wages. It really means a reduction of 25 per cent. in the earning capacity of a vast capital invested in costly machinery.

YORKSHIRE JUNIOR GAS ASSOCIATION.

Somewhat out of the ordinary was the fare prepared for the members of the Yorkshire Junior Gas Association at their meeting on Saturday, held in the Chemistry Lecture Theatre of the Leeds University, under the chairmanship of Mr. S. W. SHEPHERD, the Vice-President, the President, Mr. H. Butterfield, being still unable to be present owing to the need of treatment for an accident. Instead of the reading of a prepared paper, a series of practical demonstrations of some actual laboratory tests was given by Mr. J. W. Lee (the Chief Chemist of the Sheffield United Gas Company), with a running commentary of explanations. As Mr. Lee is a very easy, lucid speaker, with a considerable charm of manner and a ready command of happily-chosen phrases, the time passed all too quickly. Each of the tests given presented some deviations from usual and well-worn methods—generally in the direction of quicker or safer working. Interest was therefore stimulated, and close attention secured. The following is a condensed summary of his remarks.

Mr. LEE said that he almost felt an apology was needed for venturing upon such an undertaking as that before him. A man required to be brave to show a series of demonstrations under unfamiliar conditions, with many eyes watching him critically, and his own attention divided between what he was doing and what he was saying. Too often under such circumstances experiments—however carefully planned and familiar in practice—unaccountably went astray and failed to demonstrate the desired point. For the operations he was about to perform he made no claim for originality, nor that they were the best—much less the only good—methods of conducting the investigations. But he did claim, after a good many years' experience of them—first in a public analyst's laboratory, and then in that of a gas-works—that they were accurate, convenient, and reliable. He would, at the outset, tell them exactly what he purposed doing. First, he would discuss the fractional distillation of tar and tar oils, illustrating his procedure by actually distilling a tar oil. Tar he would not venture to distil before them; for a man who, with the added distraction of addressing an audience, would dare to undertake a tar distillation was more than brave, he was a hero, unless indeed he deserved classing among those who "rush in where angels fear to tread." Secondly, he would deal with the analysis of sulphate of ammonia by a method which he had never seen published, but of which thirteen or fourteen years' personal experience had proved the convenience and reliability. Thirdly, he would deal with a process for estimating cyanogen in gas which was decidedly better from a cyanide maker's point of view than most of the methods published.

Analysis of Tars and Tar Oils.

Fractional distillation is a useful laboratory test for these, and assumes additional importance in these times from the information it gives us of the naphthalene contents not only in the oils obtained by distilling the tar actually made on the works, but in the oils used for naphthalene washing, and occasionally in the benzol bought for enriching gas.

The first difficulty in carrying out the distillation of tar is that occasioned by the presence of water (in the form of ammoniacal liquor). He could give them no specific for getting rid of this great trouble. Devices which were fairly successful with some tars, sometimes failed when applied to others. Some of the lighter oils boiled below 100° C.; and when this temperature was reached and crossed, the water did not pass off quietly, but occasioned the distressing and sometimes disastrous "bumping" that so seriously complicated both the laboratory and works process of tar distillation.

The other great difficulty both with tar and tar oils lay in the fact that some of the products were liquid while others were solid at ordinary temperatures; so that the ordinary water cooled condensers could not be used at this stage, nor if used, the inevitable troubles, and the almost inevitable disaster, added variety to the operation, and one might indulge in wondering which end would give way first, until repeated burns emphasized the lesson. Text-books generally advise distillation in the ordinary way in the earlier stages, then at a given point the cutting off of the cold water supply to the condenser and the allowing of the water standing in the retort to get hot, and finally the entire discarding of the Liebig condenser. He hoped not many of them had tried this method. The difficulty of changing the method of condensing was troublesome; and often solids settled out and blocked the inner tube before the surrounding water had had time to get hot. Then, too, gradual evaporation of the water lessened its amount, and left an exposed part of the inner tube, which generally soon cracked under the dropping on it of the hot distillate.

He had undergoing distillation before them a specimen of oil containing much naphthalene. The apparatus was what he used for all tar and tar oils distillation; and he would proceed to show how the previously mentioned troubles were surmounted. First, they would notice that the side tube of the ordinary distilling flask passed down the inner tube of the condenser to at least 2 inches past the water inlet of the jacketting tube. This prevented the cracking from very hot distillates dropping on to the unprotected inner tube. He would call their attention to the need of always having the thermometer bulb in the same place—*e.g.*, with its centre opposite the centre of the side tube of the flask. They could not expect concordant results from varying conditions of testing apparatus. The distillates were all being collected in previously weighed graduated cylinders and were then weighed. Text-books often prescribed the measuring of the volume; then the finding of its density with a hydrometer, and multiplying the two together to obtain the weight. As the distillate often became solid at least in part, it was clearly impossible to take the density by means of a hydrometer at the only temperature at which the method would be accurate; while using the hydrometer in the hot liquid was going gratuitously into error. His other variation from book methods dealt with the difficulty of keeping the naphthalene and anthracene liquid until the distillates containing them got into the receivers. Most of the naphthalene came over between 170° and 270° C. When the thermometer in the distilling flask indicated 190° C., he proceeded to pass hot water through the condenser in as steady and full a stream as the cold water had previously passed. To secure this, all the water passed between the tap and the condenser through a Fletcher-Russell heater; and at 190° C. this was lighted. No other change was then necessary right through the operation—either in distilling oils or tars. No solids condensed out in the tube; no trouble arose from water boiling away in the condenser; and the incoming water, though hot, prevented excessive heating of tubes or surrounding water.

The measuring of tar was not exactly an easy operation. It was not necessary, and indeed it was inadvisable, to use clean glass measuring vessels, which could not easily be cleared. Formerly, and for a long time, he used a graduated bucket, which (if hardly comely) was convenient and economical. If they got a bucketful of tar (about 2 gallons) into a suitable vessel, agitated it well, and let it stand, much of the water rose to the surface. They could then draw off the tar through a tap and measure (say 1000 c.c.) into a weighed distilling flask. This gave them a check on the hydrometer.

Tar oil might come into their hands for testing intended for enriching the gas—for spraying it or for washing it; and it would be necessary for them to know if it was delivered from time to time of uniform quality. This was most easily done by fractional distillation. They might collect and measure the distillates in three or four fractions, changing the receivers at prearranged temperatures, or they might change the receivers at every (say) 10° C., and measure each lot, or they might collect in fractions of uniform volume (say, 10 c.c.) and note the temperature as each receiver was removed.

Estimation of Naphthalene in an Oil.

It was becoming an increasingly important test to ascertain how much naphthalene (if any) was present in an oil supplied for use as an enricher, in the "middle oils" from a tar distillation, or in the oil after use in a naphthalene washer. For this he suggested two methods.

(*a*) Naphthalene will be mainly in the fraction coming over between 170° and 270° C. This fraction is allowed to stand in a cool place for some hours, when solid naphthalene separates out. This is filtered through a weighed funnel plugged with a small piece of cotton wool, and all oil abstracted by means of a suction pump; the solid in the funnel being meantime pressed down with a spatula. The naphthalene is weighed and the oil re-distilled slowly in a small flask. The fraction from 170° to 270° C. is again taken; allowed to cool; filtered; and this weight of naphthalene found. Re-distillation, cooling, filtering, and weighing are repeated until no more naphthalene settles out.

(*b*) A small weighed quantity of the oil can be put in a flask, very gently heated, and air simultaneously drawn in through the flask by means of a suction pump, along with the volatilized oil and naphthalene. This air is bubbled through 150 c.c. of standard picric acid solution in two wash-bottles. This picric acid is then dealt with in the usual way by the Colman and Smith method—viz., boiling it and then titrating with standard sodium hydrate solution. This was the method he personally preferred.

In an actual test, he took 14·6 grams of oil, 50 c.c. of the picric acid originally needed 20·8 c.c. of decinormal sodium hydrate to neutralize it. After the test, 50 c.c. needed only 19·1 c.c.—a difference of 1·7 c.c. for 50 c.c. and 5·1 c.c. for the whole 150 c.c. used. $5{\cdot}1 \times {\cdot}1975 = 1{\cdot}00725$ grams of naphthalene in 14·6 grams of oil or 6·9 per cent.

Mr. Lee then proceeded to revise his description of a tar distillation, and to discuss a number of analyses selected at random from a very large number of tests taken. Some operators would divide the middle oils into two fractions, separating them at 230° C.; but the tables gave his practice. [See Table, next page.]

Details of Fractional Distillation of Tar—Sample D.

[Quantity of tar taken, 1000 c.c. = 1180·7 grams. Sp. gr. by hydrometer at 60° Fahr. = 1·180. First drop came over at 74° C.]

—	Cubic Centimetres.	Grams.	Per Cent. By Vol.	Per Cent. By Weight.
Ammoniacal liquor	26·0	26·0	2·6	2·6
Light oils up to 170° C.	38·0	35·0	3·8	3·0
Middle oils, 170° C. to 270° C.*	23·0	251·0	23·0	21·2
Heavy oils, above 270° C.	11·0	127·6	11·0	10·8
Pitch	..	734·7	..	62·2
				99·8

* Containing naphthalene 150·5 grams = 12·7 per cent. by weight.

—	A.		B.		C.		D.		E.		F.	
Specific gravity at 60° Fahr.	1·165		1·170		1·210		1·180		1·160		1·260	
	Per Cent.		Per Cent.		Per Cent.		Per Cent.		Per Cent.		Per Cent.	
	By Vol.	By Weight.	By Vol.	By Weight.	By Vol.	By Weight.	By Vol.	By Weight.	By Vol.	By Weight.	By Vol.	By Weight.
Ammoniacal liquor	5·0	4·3	1·8	1·5	3·2	2·6	2·6	2·2	19·0	16·4	4·8	3·9
Light oils up to 170° C.	4·2	3·3	5·4	4·2	3·1	2·4	3·8	3·0	6·0	4·7	1·2	0·9
Middle oils, 170° C.–270° C.*	25·0	24·3	33·0	28·7	21·0	17·4	23·0	21·2	28·2	22·7	13·0	10·9
Heavy oils above 270° C.	8·0	7·9	8·0	7·1	11·0	10·1	11·0	10·8	3·4	4·0	8·8	7·5
Pitch	..	60·1	..	58·3	..	66·6	..	62·2	..	50·6	..	76·4
Totals	..	99·9	..	99·8	..	99·1	..	99·4	..	98·4	..	99·6
* Containing naphthalene	..	18·9	..	19·3	..	7·7	..	12·7	..	18·3	..	6·4

A. From condensing plant only; contains no hydraulic main tar. B. Ditto. C. Principally from hydraulic main. D. From sale tank; mixture of all tar made. E. From hydraulic main and foul main. F. From hydraulic main only.

Analysis of Sulphate of Ammonia.

The usual method of boiling the salt with an alkali, and absorbing the liberated ammonia in a standard acid, was first briefly described; and then Mr. Lee proceeded to give his method.

(*a*) 100 grains are dried on a watch-glass for an hour in a water-oven, and the loss due to expelled moisture calculated.

(*b*) 10 grains are dissolved in 500 c.c. of water; 25 c.c. are used for rinsing out the pipette, and three 25 c.c. are then separately boiled with a known volume of semi-normal sodium carbonate solution. This forms ammonium carbonate, which is decomposed and driven off on evaporating nearly to dryness. This residue is dissolved again in water, and titrated with semi-normal sulphuric acid to ascertain by difference the amount of sodium carbonate equivalent to the ammonium sulphate originally present.

(*c*) The 400 c.c. left of the solution is now titrated with fifth-normal ammonium hydrate to find the amount of free acid present.

(*d*) To estimate the insoluble matter, 100 grams are taken, dissolved in hot water, filtered through a weighed Gooch crucible plugged with asbestos, washed, dried in the water-oven, and weighed. The gain in weight equals the insoluble matter.

(*e*) Half and fifth normal solutions are used, and calculated to volumes of normal solutions.

Details of an Analysis of Sulphate of Ammonia.

For Moisture—100 grams dried in water-oven.

Watch glass + 100 grams sulphate—

	A.		B.
Before drying	338·94	..	348·62
After ,,	335·94	..	345·60
	3·00	..	3·02

Moisture, 3·01 per cent.

For Ammonia—10 grams dissolved in 500 c.c. of water.

	Taken. Cub. Cent.	Normal Sodium Carbonate. Cub. Cent.	Normal Sulphuric Acid. Cub. Cent.	
(*a*)	25 ..	10 ..	2·64	7·36 c.c.
(*b*)	25 ..	10 ..	2·64	
(*c*)	25 ..	10 ..	2·64	

From these 7·36 c.c. must be deducted the volume of the sodium carbonate solution neutralized by the free acid in the solution. The next test shows that 400 c.c. of the solution contain free acid able to neutralize 0·64 c.c. of normal alkali; therefore 25 c.c. contain free acid equivalent to 0·04 c.c. of alkali.

Deducting 0·04 from 7·36 = 7·32 c.c.
1 c.c. normal alkali = 0·017 gram of ammonia.
7·32 c.c. ,, = 0·017 × 7·32 grams.
This is for 25 c.c., and the whole 500 c.c. = 0·017 × 7·32 × 20.
This is in 10 grams of salt; so the ammonia in 100 grams
= 0·017 × 7·32 × 20 × 10, or 7·32 × 3·4
= 24·9 per cent. of ammonia.
24·9 per cent. of ammonia × 3·8754 = 96·50 per cent. of sulphate.

For Free Acid—The remaining 400 c.c. took 0·64 c.c. normal ammonium hydrate to neutralize it, so 500 c.c. required 0·8 c.c. This is equivalent to 0·8 × 0·049 gram of sulphuric acid. In 100 grams it will be 0·8 × 0·049 × 10 = 0·39 per cent.

Summary—

Sulphate	96·50 per cent.
Moisture	3·01 ,,
Free acid	0·39 ,,
Insoluble	0 05 ,,
	99·95 per cent.

Estimation of the Hydrocyanic Acid in Crude Gas.

The usual method is to absorb this gas by washing with a liquid containing freshly-precipitated iron carbonate (as in the Foulis cyanide extraction process). This is made by the adding of a solution of caustic soda or potash or of sodium carbonate, to a solution of ferrous sulphate. Making a 1–3 solution of caustic potash and 1–10 ferrous sulphate in three Woulfe bottles, he should put respectively 120 c.c., 36 c.c., and 24 c.c. of the alkali, and add half as many cubic centimetres of the iron solution to each. The crude gas would be washed through all three, and the potassium ferrocyanide made estimated in the usual way.

This method the author had used and proved to be good, but a later one suggested to him by a firm of cyanide experts had proved much preferable. In one set of comparative tests, the former method gave him a yield of 5·19 lbs. of crystallized sodium ferrocyanide per 10,000 cubic feet of gas; while the newer method of testing showed 6·48 lbs. from the same gas. The reason obviously was that in bubbling through the Woulfe bottles some of the hydrocyanic acid remained in the gas because the active absorbent was the solid iron carbonate which so readily settled to the bottom of the bottles out of the way of the gas.

Instead of three bottles, only one absorbing tower is needed. The gas passes by a tube to the bottom, and then has to pass through a series of conical, perforated metal trays extending the full width of the vessel (very similar to the arrangement in the carbonating towers of the Solvay process for making bicarbonate of soda). These hold the solid iron carbonate, and as the stream of gas is greatly and repeatedly broken up, contact between the gas and the absorbent is much more thorough and effective.

25 grams of ferrous sulphate are dissolved in water, and a solution of 25 grams of sodium carbonate added and mixed with it. The precipitate is allowed to settle, and the top liquid run off. A solution containing another 25 grams of sodium carbonate is poured on to the precipitate, and enough water added to fill the vessel to above the top cone. A measured volume of gas (30 to 40 cubic feet) is then bubbled through. The liquid will now also contain sodium ferrocyanide, and a little sulphuretted hydrogen and ammonia. Make up the liquid to (say) 1000 c.c., and take 100 c.c. for further treatment. Add water and boil well to expel any ammonia and sulphuretted hydrogen. The liquid may now contain insoluble cyanogen compounds, so add an excess of caustic soda to decompose them and form sodium ferrocyanide. Any trace of sulphides may be removed by stirring in about 1 gram of solid lead carbonate. Make to a definite bulk (say, 100 c.c.) by adding water, and filter through dry filter-paper. Take 25 c.c. of this filtrate in a platinum dish, add 5 to 10 grams of solid sodium sulphate and 5 to 10 c.c. of 20 per cent. sulphuric acid. Evaporate to dryness, and finish by heating over a bunsen flame. The sodium ferrocyanide is decomposed, hydrocyanic acid gas is driven off, and the resultant mass consists mainly of sodium carbonate, sodium hydrogen sulphate, and ferric sulphate. The iron in this must now be estimated in one of the two usual ways—either volumetrically, as seems to be generally adopted, or gravimetrically, as the author personally preferred. Then the weight of ferric oxide (Fe_2O_3) corresponding to 1 cubic foot of the gas multiplied by 8·6428 = weight of crystallized sodium ferrocyanide per 10,000 cubic feet of gas; or by 7·5357 = weight of corresponding potassium salt.

At the close of the demonstrations,

Mr. S. W. Shepherd asked what advantages were claimed for this new method of estimating sulphate of ammonia, and why Mr. Lee used ammonia as the standard solution for estimating free acid, instead of sodium hydrate or carbonate.

Mr. Lee said he made no claims on the ground of greater accuracy, but merely recommended it because, in practice, it proved so much more rapid and convenient. It obviated much fitting up of apparatus, the condensing, and some of the weighings. He used ammonia for his standard solution because it was somewhat easier to make up, and had less effect on india-rubber connections. They used a reservoir of about 5000 c.c. of the solution, and had the burette attached to this; hence the inadvisability of soda solution. They used large quantities of this standard solution, and this 5000 c.c. lasted as a rule about a fortnight. In that time they found no change in the strength of the solution. To obviate loss of its ammonia, air to replace the liquid entered the vessel through an absorption bulbed tube, containing some of the same ammonia solution as that in the vessel, and so was itself charged with ammonia to about the same extent as the liquid.

Mr. Cranfield spoke in appreciation of the combination of literary felicity and of scientific accuracy and minuteness in Mr. Lee's address; and he welcomed it as an instance of the practical

helpfulness in the every-day routine of the work that was one of the main objects in view when the Association was first formed. They rejoiced that the various Junior Associations had not only revealed to the profession at large what was already known in narrower circles—that among the juniors were men of fine ability and notable professional calibre and stature, but had shown that these men were ready and glad to render invaluable service in helping their younger and less advanced *confrères*. An amount of publicity unexpected by those who were in at the formation of the earlier Junior Associations now played around some of their meetings. This had some disadvantages to set off against its advantages. But in unobtrusive ways, in private conversations at and after the meetings, in what was seen at visits and such demonstrations as that day's, and especially in the informal and prolonged questioning and discussion around the lecture-table that would follow at the close of the meeting, much lasting benefit was conferred on their members. They highly appreciated Mr. Lee's services that day; welcomed him on his first appearance as the chief personality at a meeting; and hoped that this spontaneous address and demonstration would be a kind of "preliminary canter" to be followed by later victories.

Mr. EDWARDS confirmed from his experience, as Chief Chemist of the Leeds Gas Committee, the essentially practical nature of the experiments shown, and the improvement they exhibited over older and more usual methods. He had been interested in the sulphate of ammonia test, and the more especially as he used the same method of boiling with sodium carbonate, &c., in estimating the ammonium sulphate in the final liquid in the Gas Referees' test for sulphur in gas.

Mr. W. N. BOOTH said he had followed the tests with great personal interest, and while glad to hear how Mr. Lee minimized the disadvantages accruing from the presence of water in the tar, he could bear testimony to how great a source of trouble it was. He remembered that on one occasion he had to deal with some tar from a carburetted water-gas plant where the heats had been allowed to get too high. The tar contained much naphthalene, free carbon, and water. In the midst of his distillation, the flask blew to pieces just as a mechanic was coming into the laboratory. The experience and the after-effects were such that he could never induce the man to enter the laboratory again. He thought the trouble was not the fact of condensed water falling back on to very hot tar, so much as that, when out of contact with solids, the surface-tension of the water globules was so high as to enable it to overcome the vapour tension of the water at 100° C. and higher; for the tar could be at 150° C. and yet contain water. Eventually the vapour tension at the temperature continued to rise, became so high that it finally overcame the surface tension, and caused the violent explosion and scattering of the water globules that they were familiar with under the name of "bumping." All his experience with cyanogen testing in gas had been with the use of ammonium polysulphides, and he usually found a yield of about 6 lbs. of ammonium sulphocyanide per ton of coal carbonized.

Mr. SHEPHERD declared that he was quite enamoured of the sulphate of ammonia test, and its obvious rapidity and ease of manipulation. Still he only used one weighing for estimating ammonia and free acid by his older methods.

In replying to a cordially endorsed vote of thanks,

Mr. LEE expressed his indebtedness to Mr. Edwards (of Leeds) for the loan of apparatus and much helpfulness and kindness in connection with the preparations for the meeting, and to his assistant Mr. George Ingham. He heartily endorsed what had been said as to the value of private chats and questionings about the subjects of their addresses; and he hoped at the close that the members would examine the pieces of apparatus, question him, and exchange experiences to their hearts' content.

This invitation exactly met the wishes of the audience, and the room exhibited a busy scene for long after the formal meeting closed. Many who preferred not to speak or put questions in public, more than made amends in the privacy and informality of the later proceedings.

Dr. J. W. Gregory, Professor of Geology in the University of Glasgow, read a paper on Glenboig fire-clay at a meeting of the Royal Society in Edinburgh on Monday of last week. He said there was evidence to show that this fire-clay was laid down in a wide lagoon in the beginning of the millstone grit period. This was shown by its mineral composition. It contains lenticular crystals of sideroplesite, which have been built up by zonal deposition around rhombohedra, which properly crystallized in the water of the lagoon. The clay substance which forms the base of the fire-clay is isotropic, and is referred to the mineral halloysite. The clay contains no kaolinite.

At a recent meeting of the Council of the Royal Society of Arts, the Chairman (Sir William H. White, K.C.B.), on behalf of the subscribers, presented to Mr. H. B. Wheatley, on the occasion of his retirement from the post of Assistant-Secretary of the Society, a silver salver and a cheque for the balance of the subscriptions, to be expended on the purchase of books. The salver bore the following inscription: "Presented, together with a gift of books, to Henry Benjamin Wheatley, by present and past Members of the Council of the Royal Society of Arts, in recognition of his services as Assistant-Secretary of the Society from June, 1879, to December, 1908." Mr. Wheatley was also elected a life member of the Society.

GAS COOKING AND HEATING APPLIANCES

At Messrs. Orme, Evans, and Co.'s Show-Rooms.

THOUGH the firm has been established for nearly half-a-century, it is only during the past couple of years or so that Messrs. Orme, Evans, and Co., Limited, of Elgin Works, Wolverhampton, have established a gas-cooker department. Now, however, they are turning out various appliances in which gas is the agent employed, for both cooking and heating purposes; and samples of these goods are to be seen at the London show-rooms—Bath House, Holborn Viaduct.

The "Cecil" Gas-Cooker.

The gas-cookers are of several patterns, each being of British make throughout, with all parts interchangeable. In one of them —the "Cecil," which is here illustrated—porcelain enamelled steel sheets form the sides and back of the range and the inside of the oven; this casing and the door being packed with non-conducting material to retain the heat. The interior of the oven and the inside of the door are also enamelled; these linings being fixed without any screw-heads on the face of the enamel. In this way, a clear surface is provided for cleaning. The oven capacity is utilized to the fullest extent, by the rack and grid carriers being formed in the sides of the lining, as shown, which renders the entire width available for working purposes. The oven is fitted with a double crown, over which the heat travels before passing away, thus ensuring a high temperature at the top of the oven. Under the hotplate, there is an enamelled crown plate, with a drip-catch, which, of course, prevents the front of the cooker being soiled with grease, &c. The top bars of the hotplate itself are in two sections, which can be instantly removed for cleaning or taking out the burners. This cooker, which has a neat appearance, is specially suitable for use in connection with shilling slot-meter installations. The "Phœnix" is very much the same in construction as the "Cecil," but made in a larger size. There is ample space between the top of the stove and the hot plate for warming dishes, &c.; and the large grilling and boiling burners surround a simmering burner. These three burners are in one casting (but controlled by three separate taps), which is the invention of Mr. Thomas Ward, who has the charge of the firm's cooker department. The lower section of the burner furnishes the heat for grilling, the upper section for boiling large vessels, and the centre ring for simmering. The object of the introduction of the last named is to obviate the waste of gas which is liable to occur when a large burner is used for simmering purposes. This combined burner is also fitted to the "Household" gas-griller. Connection can be made to the gas supply either at the front or the back of the griller; the wrought-iron supply pipe being screwed at each end, and fitted with a brass cap.

Among the heating appliances on view there are a new pattern "Radiant" luminous flame hot-air circulating gas-stove, and a porcelain enamelled circular stove of the same character, which is claimed to be a most effective heater with a gas consumption of 8 cubic feet per hour. There are also geysers in enamelled steel and copper (for high or low water pressure), without any tubes or chambers for the gas to impinge upon. The water runs down on the inside wall of the apparatus until it is caught in a deep trough, whose sides slope slightly towards the centre of the

vessel. In this way, rapid heating takes place. Mention may be made, too, of the "Ormonde" steel enamelled (inside and outside) gas-heated hot-water boiler and wash-copper, which has a capacity of 12 gallons. This is fitted with a galvanized steel lid, which, besides being hard wearing, is exceedingly light for handling. This boiler, which is claimed to be the only enamelled steel one on the market, is very neat in appearance. Finally, it may be remarked that the firm—who, of course, possess every possible facility for carrying out work of this kind in a first-rate manner—make a speciality of enamelled utensils of all kinds for use with gas-cookers.

CONNECTING SERVICES TO MAINS.

Woodall and Parkinson's Expansion Nipple.

In our issue for the 9th ult., it was stated that the Gaslight and Coke Company had decided to adopt, in connection with the 6-inch Mannesmann high-pressure steel main running down Bouverie Street, E.C., the Woodall and Parkinson patent expansion nipple. This is a device for riveting by expanding the end of the branch connector inside the main; and the sole manufacturers are Messrs. J. Stone and Co., of Deptford.

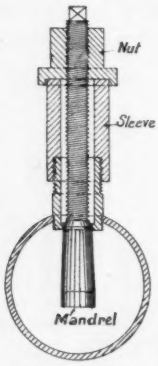


Fig. 2.—The Mandrel, Sleeve, & Nut.

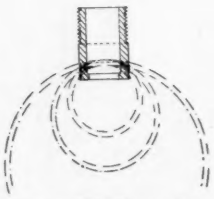


Fig. 1.—The Expansion Nipple.

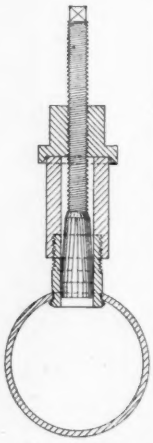


Fig. 3.—After Expansion.

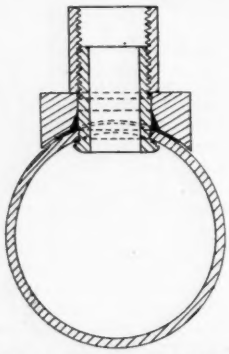


Fig. 4.—The Completed Joint.

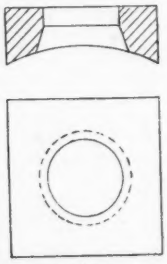
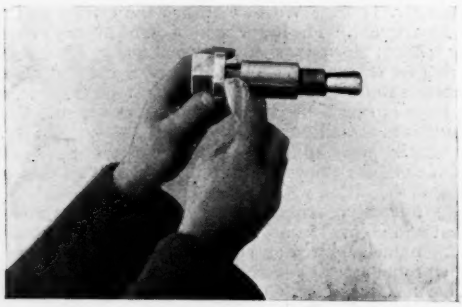


Fig. 5.—Cast-Iron Saddle.

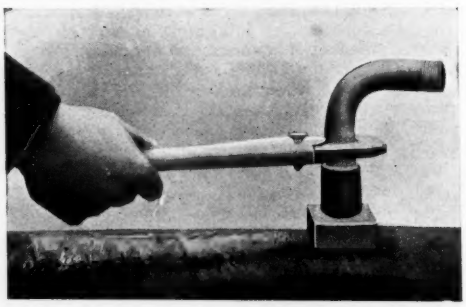
The nipple (fig. 1) is provided with an internal annular bead at its inner end; and, on a tapered mandrel being drawn through, the bead opens out the end of the nipple within the main. Fig. 2 shows the mandrel, sleeve, and nut which, together with a ratchet spanner, comprise the necessary tools for expanding the nipple. These are put together and screwed into the main; the nipple being tightened down with tongs or footprints in the usual way. Then the nut is operated with the ratchet spanner until the mandrel is drawn through clear of the expansion bead (fig. 3),



The Mandrel, Nut, Sleeve, and Nipple being put together, with Russian Tallow on the Face of the Nut.

The Mandrel, Nut, Sleeve, and Nipple being Screwed together into the Main.

The Mandrel Coming Through.



Screwing in a Bend, when the Joint is on the Top of the Main.

after which the sleeve can be unscrewed and the mandrel removed, leaving the nipple firmly secured in the main. A gutta-percha ring is next placed over the nipple, and pressed down by a saddle, fig. 5. An ordinary socket screws down on the saddle, and the gutta-percha ring is squeezed into an angular section. A plug can be screwed into the socket pending the connection of the service, or a cap or elbow substituted. The method of connecting a service to a main by means of the expansion nipple is clearly shown by fourteen illustrations (of which four are reproduced) in a circular which has been issued by the makers.

Numerous advantages are claimed for the arrangement—among the first of which may be mentioned great strength, simplicity, soundness, and durability. No clips or bands are required, connections can be made at any angle to the main, the jute covering on steel tubes need not be disturbed, and the expanding of the nipple corrects any loose tappings. The device is adaptable to machines for inserting ferrules in high-pressure mains; and the joint has been tested under pressures exceeding 2000 lbs. per square inch.

Action of Sea Water on Cement.—At a recent meeting of the Newcastle Section of the Society of Chemical Industry, a paper was read by Mr. Charles J. Potter on "Chemical Changes in Portland Cement Concrete and the Action of Sea Water Thereon." The author was led to investigate the reasons for the changes effected in some concrete by the action of sea water, and he ascertained that the injury was due to the magnesium salts found in the water. By means of practical tests, he discovered that the magnesium sulphate was the most active cause of the trouble. The feebly combined lime and alumina in the cement become decomposed, forming calcium sulphate and alumina compounds, which on taking up water on crystallization effect the bursting of the concrete. To counteract this action, after trial of various materials, it was found that burnt red brick clay ground with the cement when mixing gave the best results. A series of tests made of 10 parts of cement and 6 parts of clay are given in the form of diagrams, in which the beneficial influence of the clay is very marked.

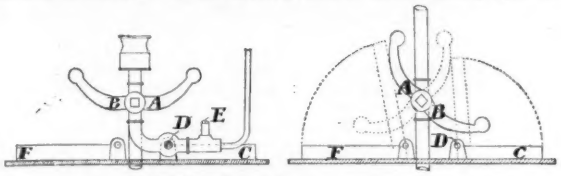
REGISTER OF PATENTS.

Incandescent Street-Lamp Fittings.

STOTT, J., of Shaw, near Oldham.

No. 391; Jan. 7 (June 23), 1908.

According to this invention, the supply tap fixed on the bottom of the lamp inside is made with a double lever A B; and when the door C is pushed up at the bottom of the lamp, it lifts one lever of the tap up and turns gas on to the burner. The bye-pass valve is fixed to the end of the hinged rod D of the door C; so that when the door is opened the bye-pass is turned on. The bye-pass tube goes along the bottom of the lamp, then turns up the side to the height of the chimney. It has a small hole E at the bottom of the bye-pass tube in addition to the exit hole at the top. On the ignition tube or torch pushing open the



Stott's Lamp-Lighting Fitting.

door, it comes in contact with the lower hole E, which sends light to the top hole and thence to the burner. On the torch being pulled down the door drops in position again and turns the bye-pass off by means of the hinged rod of the door, and leaves the gas on to the burner only. When the light has to be turned out, the lever of the burner-tap is lifted up on opening a door F at the other side of the lamp, which turns off gas to the burner and leaves the lever on the opposite side in position again ready for lighting.

Controlling Devices for Inverted Incandescent Burners.

HINTON, E., and ANDREWS, F. A., of Hall Place, Paddington, W.

No. 2688; Feb. 6, 1908.

This type of gas-controlling device is described in patent No. 16,722 of 1904—a valve lying normally on its seat being caused to rise under the pressure of the entering gas and open communication between the supply pipe and the burner. It also relates to pilot lights in which a ball-valve of the usual type partially closes the passage to the pilot-flame.

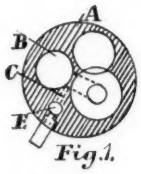


Fig. 1.

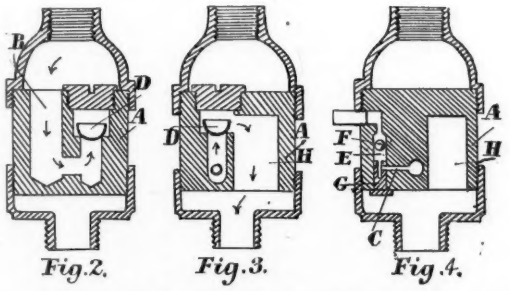


Fig. 2. *Fig. 3.* *Fig. 4.*

Hinton and Andrews' Burner-Controlling Device.

Fig. 1, a sectional plan; fig. 2, a section showing the inlet for the gas and the valve which controls the main flame; fig. 3, a section showing the valve-chamber with the outlet to the burner below; and fig. 4, a section showing the valve which checks the pilot-light.

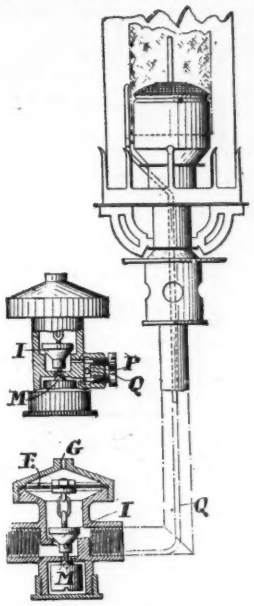
The body or shell A (which is screwed between the supply pipe and the burner) has two separate gas-passages B and C—the former supplying the main burner flame and the latter the pilot-jet. The gas first enters the passage B, and, after lifting the dish-shaped valve D, passes through a passage H to the burner. The smaller passage C leads through a chamber E to the pilot-light; being fitted with a ball-valve F, resting on a plug G, which acts as a check upon the amount of gas passing to the pilot-light.

Controlling the Supply of Gas to Burners.

JONES, C. J., of South Woodford, and STILL, W. M., of Charles Street, Hatton Garden, E.C.

No. 3177; Feb. 12, 1908.

This invention is more particularly designed for use in connection with the gas-burners of railway carriages; the object being to enable the gas to be lighted from a pilot-flame upon turning on the full gas pressure, without it being necessary to use a separate main for the pilot burners, which has hitherto been employed in order to obviate large pilot flames due to the high-pressure of the gas.



Jones and Still's Gas-Supply Controllers.

The illustration shows vertical sections of the valve at right angles to each other, where the casing comprises upper, lower, and intermediate chambers. The upper chamber, in communication with the main burner, is enlarged and closed at the top by a diaphragm E of (say) thin metal, oiled silk, or leather, and clamped in position by a screw cap having a small air hole G. The lower wall of the chamber is formed with an opening communicating with the intermediate chamber and controlled by a valve I connected to the diaphragm. The valve (usually conical) is linked to a screw that passes through the diaphragm, and is fitted with a clamping nut. The intermediate chamber, which is in communication with the gas-supply pipe, has formed in its lower wall an opening communicating with the lower chamber and controlled by a valve M in the lower chamber and connected to the valve I, which controls the admission of gas to the upper chamber so as to move with it. The lower chamber is formed with a passage leading to a chamber P formed in the valve casing whence leads the supply pipe Q of the pilot-burner. The adjusting screw of the passage is so set as to allow enough low-pressure gas to pass to maintain the requisite pilot-flame when communication between the intermediate and lower chambers is open. There is also a fine passage from the intermediate chamber of the valve to the chamber P, the adjusting screw of which is so regulated that, when the full pressure of the gas is turned on, and the main burner is alight, just sufficient gas will pass to the pilot-burner to provide the requisite flame and maintain the pipe to the pilot-burner charged with gas, and thus ensure that, on the closing of the valve I and the opening of the valve M, the pilot-flame shall not be extinguished. The valve M is weighted so that movement of the valves I and M corresponds with the desired alteration in pressure.

Calculating the Velocity of Flow and Rate of Discharge of Water in Pipes, Culverts, and Channels.

ESSEX, E. H., of Leyton, Essex.

No. 6278; March 20, 1908.

This invention belongs to the class of device in the nature of a slide-rule by means of which, for any size of pipe, culvert, or channel, and for any gradient, the velocity of flow can be ascertained in the terms of any chosen formula and so that the rate of discharge can be similarly obtained.

The device comprises a board with longitudinal recessed guides cut or formed in it. Fitting nicely in the guides, and longitudinally movable in them, are two sliding members. The adjacent edges of the board and sliding members are provided with scales. The upper part of the board bears a fixed gradient scale giving the logarithmic divisions for the square root of the sine of the inclination of the pipe. The adjacent sliding member bears a diameter scale showing logarithmic divisions for an empirical constant (Essex formula) multiplied by the square root of the hydraulic mean depth (conveniently in inches).

The Essex formula is as follows: $v = c\sqrt{r}\,s$ wherein v = velocity in feet per second, r = hydraulic mean depth, s = sine of inclination, c = empirical constant—

$$\begin{cases} 55 + 75\sqrt{r} \text{ up to pipes of 27 inches diameter.} \\ 100 + 18\sqrt{r} \text{ up to pipes of 108 inches diameter.} \end{cases}$$

On the edge of the board below the sliding member, and adjacent to it, is a velocity scale giving the logarithmic divisions from 1 to 10 or more representing the velocity (conveniently in feet per second); and the edge adjacent to the second sliding member may bear the same scale reduced. This second sliding member bears a diameter scale showing logarithmic divisions for the area corresponding to the diameter of the pipe (conveniently in inches). Below the second sliding member the board carries a fixed scale showing logarithmic divisions corresponding to the rate of discharge (conveniently in cubic feet per minute).

The divisions on the upper sliding scale are dependent upon the formula which is used. Generally the velocity of flow is taken to be the product of a constant and the square root of the hydraulic mean depth multiplied by the sine of inclination. The divisions on the sliding-scale, therefore, depend upon the constant employed. Conveniently the main sliding member may carry on one face divisions corresponding to some typical well-known formula—*i. e.*, Kutter's

$$v = c\sqrt{rs} \qquad c = \left(\frac{139{\cdot}3 + 41{\cdot}6 + \frac{{\cdot}00281}{s}}{1 + \left(41{\cdot}6 + \frac{{\cdot}00281}{s}\right)\frac{{\cdot}013}{\sqrt{r}}} \right)$$

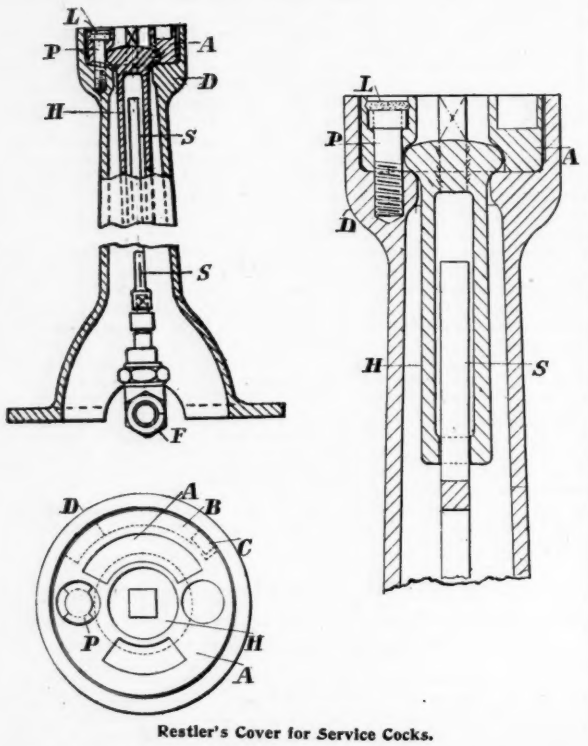
The main sliding member may bear two scales—one calculated on the basis of a certain constant, and the other so that, instead of the chosen constant represented by the pointer used in the scale, any other constant corresponding to the depth of water in the pipe may be employed, the corresponding velocity in feet per second being read off the scale opposite the chosen constant in the scale. In the same way, the second sliding member may bear at its lower edge a scale so arranged that, instead of indicating only the discharge from a full pipe, the discharge for proportionate depths of flow can be obtained by reading off the scale opposite the chosen depth of flow. Alternatively, the sliding member may bear on one side a diameter scale for circular pipes and on the other face a diameter scale for oval culverts, or a scale of hydraulic mean depths for channels.

Covers for Service Cocks for Gas, Water, &c.

RESTLER, J. W., of Queen's Gate, Kensington, S.W.

No. 7399; April 3, 1908.

This invention has for its object the provision of improved lids or covers, and means for securing the cover or lids, to prevent gas and water service cocks from being interfered with by unauthorized persons, or to detect that they have been so tampered with after having been left in the position of "open" or "shut."



Restler's Cover for Service Cocks.

The circular lid or cover A has a groove or slot B in its outer circumference; and the upper part of the cock box D, into which the lid is placed, has one or more corresponding pegs or projections C—the whole forming a "bayonet" joint, and preventing the lid being withdrawn until after being turned partly round. The lid is locked (after being put into position) by means of one or more screws, pins, or dowels P. When screws are used, the threads are made "left hand," so as to prevent the lid being turned to the position of removal. A space is left above the head of the screw to afford means of introducing a seal L, of lead or other composition that will expand into the grooves in the space above.

The spindle of the cock F is brought up into the box D, either by the elongation of the spindle itself or by means of a false spindle S, with a shank of square section, or it may be of triangular or other section, the lower end of which engages with the cock either by means of a socket formed to fit the cock, or a socket may be formed on the cock itself and the spindle arranged to engage with it.

A hollow sleeve or cap H, having a hole at its lower end capable of engaging with the service cock spindle, is introduced between the lid and the upper part of the cock box; the hollow part of the sleeve and the length of the spindle being arranged so that a space is left above the top of the spindle sufficiently long to allow of small variations in the depth of the service cock below the road. This clearance prevents any downward pressure or blow being transmitted through the sleeve or cap H and spindle S to the service cock or pipe.

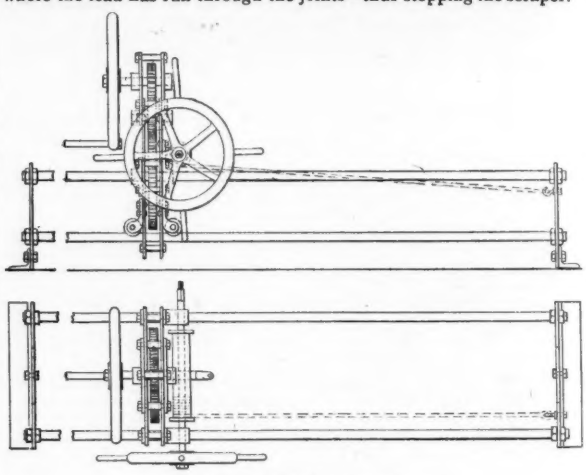
When it is desired to discontinue the supply through the service pipe, the valve F is closed and the cover A removed. The false spindle S may then be taken away and the lid replaced; or the cap H may be removed and a "dummy" sleeve substituted, and the lid replaced. The cap H may likewise be removed and a blank cover (or one without a central hole) substituted for the cover shown. The same course is taken when it is desired to leave the service cock at the position of "open"—the cover A being replaced and sealed so as to prevent any tampering or interfering with the service cock by any unauthorized persons without first breaking the seal and removing the cover.

Scraping and Cleaning Water-Mains.

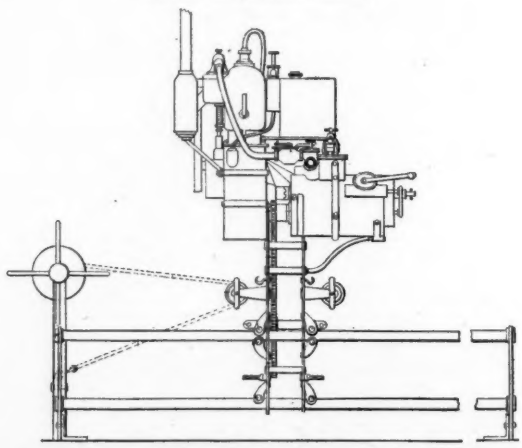
PUTMAN, W. E., and RAWDEN, J. W., of Morley, near Leeds. Partly communicated by JAMES GODWIN, of the Monte Video Water-Works Company.

No. 9200; April 28, 1908.

This scraper—designed for cleaning and restoring to their original internal diameter water-pipes that have become scaled or furred, or on which any deposit may have been formed—is said to differ from other scrapers in the following respects: Most scrapers are worked by being fixed on to a length of rods which are pushed forward and at the same time twisted by hand, or they are caused to revolve by the pressure of water at the back of the scraper. By the former means the process is extremely slow, the work is not efficiently done, and only short lengths can be scraped, which necessitates having to break into the pipes very frequently at great cost. By the water pressure method of making the scraper revolve, it is necessary that there should be an effective head, and great difficulty is experienced (especially in small sizes of pipes) owing to the material that is being cut from the pipes accumulating round and in front of the cutters. There is also a difficulty in cases where the lead has run through the joints—thus stopping the scraper.



The Hand-Operated Machine.



The Power-Operated Machine.

The present pipe-scraper is constructed as follows: Two steel end plates (each 20 inches by 15 inches) are fixed 7 ft. 6 in. apart and kept in position by having a steel rod fixed from each corner to the respective corner of the other plate—thus forming a rectangular frame. The rods form the guides or runners on which the carriage travels that supports the mechanism which causes the scraper to revolve. The travelling carriage consists of two steel plates (spaced 2½ inches apart), with holes through each top corner through which the two top rods are passed, and with wheels at the bottom of the plates to run on the lower rods. The carriage can thus travel the whole length of the frame (about 7 ft. 6 in.).

Fitted through the centre of the plates is a main shaft carrying a large toothed wheel, and immediately above this is another shaft carrying a smaller toothed wheel; the two wheels being arranged in gear, so that when the upper wheel is made to revolve, it has the effect of causing the main shaft below it to also revolve. The end of the main

shaft has a joint to which a rod about 6 feet long is attached; and to the other end of the rod a scraper is fixed, so that by turning the upper wheel the scraper is revolved.

To the front plate of the carriage is attached a drum, fitted with a hand-wheel at one end; and round the drum a rope is passed fitted with a hook at the end. The forward end plate of the rectangular frame is provided with an eye-bolt to which the hook at the end of the rope is attached. By causing the hand-wheel to revolve, the travelling carriage carrying the mechanism is pulled forward, thus giving a forward movement to the scraper and keeping the cutters up to their work.

When a 6-feet length of pipe has been scraped, the end of the rod is uncoupled from the travelling carriage, which is then pushed back along the guides and another length of rod inserted, and so on until the length of main (about 100 yards) is scraped.

When it is wished to withdraw the rods, the travelling carriage is run back along the guides and secured to the rear end plate of the frame by means of a bolt. The hook on the rope is then attached to the end of the scraper rod, and the drum revolved until a 6-foot length can be drawn out. This is then uncoupled and the hook attached to another 6-feet length, and so on.

The main shaft can be revolved either by manual power or (preferably) by a small motor.

The scraper is built upon a steel rod about 2 feet long. At the front end a solid steel tapered cutter is fixed with six cutting edges, so as to give a lead to the scraper. Behind the solid cutter are securely fixed three steel tapered spiral cutters (about 18 inches long), passing through a boss at the rear end, with slotted holes so that the cutters have a slight inward motion on meeting any undue obstruction. These spiral cutters are kept up to their work by a spring fixed between them and the steel rod. Between each pair of spiral spring cutters is a fixed cutter carried by the steel rod; and immediately behind the cutters is mounted a wire brush, which is also kept up to its work by springs. The brush is semicircular in shape, so that the material cut from the pipes can be readily washed away.

Prepared Tar for Road Making.

CLARE, J., of Lytham, Lancs.

No. 11,287; May 25, 1908.

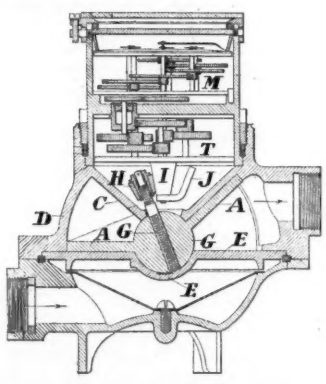
The patentee proposes to use 100 parts of gas tar, with two parts of resin, one part of gum—stirring well and boiling until thoroughly dissolved, then adding gradually and carefully three parts of sulphuric acid.

Meter for Compressed Gas.

COMPAGNIE POUR L'ECLAIRAGE DES VILLES ET LA FABRICATION DES COMPTEURS ET APPAREILS DIVERS, of Paris.

No. 12,740; June 13, 1908. Date claimed under International Convention, June 18, 1907.

This invention relates to "disc meters" for compressed gas, in which a movable receiver in the form of a cone is adapted to rock about a shaft passing through its apex and simultaneously about one of its generatrices—there being arranged immediately in front of the inlet for the gas a lubricating device of the "compensated pressure" type which automatically drops lubricating oil into the conduit supplying the gas to the meter, whereby the gas becomes saturated with the oil and, being carried directly into the meter, lubricates the movable disc actuating the recording mechanism, and so prevents heating, deformation, and breakage of the disc.



A French Compressed Gas-Meter.

The meter casing (as shown) contains the operating member proper, constituted by a conical body A. A ball and socket joint B is arranged on the apex of the cone, so that when the fluid flows through, the cone is capable of displacement in a chamber formed by a conical wall C, the conical wall D, and a disc or plate E receiving the ball. The gas enters the left-hand portion of the chamber F through an opening provided in the base-plate and fills this part of the chamber, which is divided by a partition which is let into a slot running along one of the generatrices of the cone A.

Owing to the flow of the gas, the two movements referred to are given to the cone—their resultant producing the rotation of the spindle G around the centre of the ball. A small roller H is loosely mounted on the end of the spindle and runs upon a conical part I, the spindle of which is provided with a driver or finger J and drives the clockwork mechanism M of the meter through gearing T.

The meter is connected with a lubricator (provided with a dial and an automatic discharge) inserted in the conduit in front of the gas inlet to the meter. The lubricator consists of an upper reservoir in communication with the lower chamber of the lubricator by two tubes of different diameters, the larger of which extends almost to the plug, while the smaller finishes at the bottom of the oil reservoir. Fixed in the casing is a cock, which has fitted in it parallel passages corresponding to, and adapted to be in communication with, the tubes when the plug is turned on to allow the oil to drip from the top reservoir to the chamber below. The pressure of the gas circulating in the meter is exerted upon the surface of the oil, and nothing prevents it from flowing through the smaller tube and falling into the chamber below. The oil does not, however, stop in the chamber, but is carried along as it falls drop by drop by the current of gas into the moving parts of the meter which it lubricates.

Gas-Engines.

BROUGHAM, F. J.; a communication from the SOUTHWARK FOUNDRY AND MACHINE COMPANY, of Philadelphia, U.S.A.

No. 13,260; June 22, 1908.

This invention, relating to mechanism for governing gas-engines, is said to be distinct from others of the kind by the provision of yielding connections between the valve gear and the distribution valves which control the admission of fuel to the various combustion chambers of a single engine, and the electrically-controlled locks for normally holding the valves in the initial position, and the circuit controlling devices releasing the locks in regular order comprising a contact carried by a shaft geared with the shafts of the engine and a normally stationary set of contacts carried by a ring which is normally stationary, but is connected to the governor so as to be angularly adjusted as the speed of the engine rises or falls.

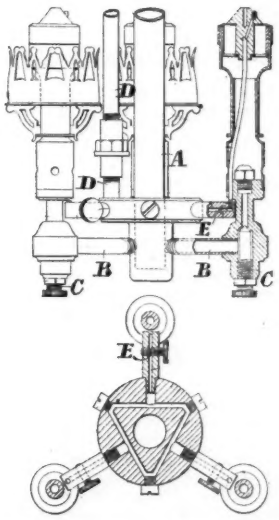
In this way, the admission of gaseous fuel into the various combustion chambers of the engine is automatically regulated in accordance with the speed conditions of the engine, while at the same time complex mechanical connections between the various admission valves and the speed governor are avoided. Moreover, the power for moving the distribution valves is furnished by the valve gear, and not by the electrical means which control the locks, so that the electrical means may be made with simplicity and reliability of operation. The electrical-controlling connections can also be so placed that they do not interfere with the operation of other parts of the engine—tending in this way to simplify the construction and operation of the engine as a whole.

Gas-Burners.

PHILPOTT, T. S., of Wellington, New Zealand.

No. 19,371; Sept. 15, 1908.

This invention relates to incandescent gas-burners working with a pilot-light; and the object is to provide a pilot-tube which is "practically straight, so that there is very little lodgment for deleterious matter within the tube, and so that a wire can be readily passed through the tube—the parts being so constructed that the burner itself can be readily taken apart and cleaned."



Philpott's Incandescent Burner Fitting.

The main gas-pipe A is connected to a base from which branch pipes B lead to the burners. The gas passing to each burner is regulated by a screw C having a conical end capable of closing upon a valve seat formed in the burner. The pilot gas-tube D is connected to the base wherein a triangular channel is formed, communication between the apexes of the triangle and the exterior of the base being closed by screws. Holes from the exterior of the base to the triangular channel are fitted with plugs provided with holes extending throughout nearly their whole length. Holes at the end and at the top of the plugs meet these holes, which are traversed by screws, by turning which the holes E allow more or less gas to pass as desired. Each pilot-tube is practically straight; and when it is desired to clean it, the burner fitted to it is unscrewed from the base, and the base is then unscrewed from the branch pipe B and the screw C removed—leaving all the parts accessible for cleaning.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Pneumatic Lighting Pushes.

SIR,—The metal piston which constitutes the gas-valve in this apparatus should always slide endwise in its chamber with perfect ease. Considerable annoyance, however, has been caused through these pistons not only refusing to work by air pressure, but becoming so tightly wedged as to require considerable hand pressure to move them. It had been observed that a white deposit was invariably found upon pistons refusing to work; and a careful investigation into the nature of this deposit has been carried out in the laboratory of the South Metropolitan Gas Company, with a view to overcome the difficulty. Only a small quantity of the white substance could be obtained for analysis, which rendered its examination somewhat difficult. As a result of the examination, however, two constituents of the gas were suspected as tending to produce the white deposit—the first being oil vapour, which is held by gas from which naphthalene is extracted by oil; the second, hydrocyanic acid. Further, it appeared that the atmospheric air which slowly diffuses into the chamber played an important part in the production of the white substance; and it was demonstrated that pneumatic pushes worked admirably in at atmosphere of coal gas. A theoretical explanation of this lies in the knowledge that oxygen is essential when hydrocyanic acid reacts with metals to form cyanides.

Experiments were carried out to show the effect of removing the hydrocyanic acid, and leaving the oil vapours in the gas. No white deposit could be produced under these circumstances; but when steps were taken to have the gas fully saturated with oil vapour (a condition which does not exist in the gas-mains), the pistons showed a tendency to work sluggishly, but never absolutely refused to work. There were no signs of chemical action. When the oil vapours were extracted from the gas and the hydrocyanic acid allowed to remain, the pistons were soon liable to stick, but not so readily as when the oil vapours were present. It was, however, evident that the presence of oil vapours augmented the difficulty, and pistons receiving a coat of oil film seemed to be better adapted for arresting hydrocyanic acid from the gas; the oil acting as a medium through which the chemical action takes place.

Various materials in which to manufacture the valve and its containing chamber have been suggested. It was thought that steatite would be a very suitable material for a piston working in a brass or other metal chamber. On mentioning the matter to Mr. Simmance, he said: "Why not use the raw instead of the baked material, as its greasy nature would produce its own lubricant." We have now had pushes at work for a considerable time with plunger valves made of this material, which is not adversely affected by the constituents of coal gas, and continues to work smoothly in the valve-chamber. Graphite may also be recommended. The steatite piston is made and fitted exactly like the ordinary brass piston; but, as stated above, it is not liable to the disadvantages of sticking, which sometimes render the usual pneumatic push apparatus for gas lighting unpopular after a short trial.

EDWARD EVANS.

South Metropolitan Gas Company, Old Kent Road, S.E., March 16, 1909.

The Make and Sale of Coke.

SIR,—With your permission, I propose dealing with some of the points in my recent paper on the above subject which have been the subject of comment. The paper was contributed for the purpose of stimulating interest in the development of purely home or local trade, the comparative neglect of which is largely responsible for the dumping and cross dumping of coke in different parts of the country.

In the attempt to obtain some idea of the total quantity of gas coke placed on the market, calculations were based on a sale of 10 cwt. per ton of coal carbonized. I am, however, quite in agreement with you that such calculation cannot be exact, since practice varies both as to the computation of "works fuel" and of the amount of coke sold. The averages obtained from published analyses may not therefore be of great service. Mr. Kendrick looks upon 10 cwt. as being too high; and your leader suggests that, as some undertakings book as "works fuel" only the coke used in the retort-house furnaces, the figures occasionally given as "coke available for sale" require discounting. My basis was given "at the most" as 10 cwt.; and this virtually represents the mean of Field's average of 9·44 and the 10·8 cwt. indicated by calculation as the highest quantity possible from the majority of coals. If the estimate of the total quantity of coke marketable is overstated, so much the better for the purpose in view—that of suggesting how far the universal development and satisfaction of purely home custom will reduce the country's surplus gas coke to a percentage less than that required by the cement, malting, engineering, and other branches of industry dependent upon no particular district.

It is unquestionably the experience of gas undertakings which have undertaken the preparation of coke for domestic, smithy, and other particular purposes, that the local trade has increased and sales outside the district have diminished. The figures submitted in the paper confirm this. The fact cannot surely be too strongly emphasized, if only to induce those undertakings which for various reasons have not yet done so to establish the broken coke supply as a regular part of their business. The three classes "A," "B," and "C" referred to in the paper comprise fifty works; and it would seem that seventeen alone sell broken coke. In some of the remaining cases, circumstances may be against this trade; but taking the proportion as half, and representative of the country, the practice of selling broken coke, when universal, will make an appreciable reduction in the quantity of otherwise surplus coke.

As you remark, some special effort will be required, in districts where broken coke is an untried fuel, in order to cut through existent prejudice; and it is undoubtedly to induce discussion on this and other points that Mr. Kendrick instances difficulties in the way of the introduction and use of coke in domestic grates in consequence of the extra household trouble involved and the conservatism of both mistress and servant. There are, of course, grates which do not lend themselves to the combustion of coke; but there are many, and particularly of modern construction, quite suitable for either coke alone or coke and coal mixed. The best answer to the objection is the fact that in many towns coke has been, and is being, used as a domestic fuel. Instances could be given of gas undertakings where, within three or four years, the broken coke trade has risen to 14 and 15 per cent. of the total output; and of others where, after years of such supply, percentages of 24 and 25 per cent. have been reached. I have one return (received too late for inclusion in the published figures) which shows, as a result of over twenty years' work, that 69 per cent. of the coke is sold as broken, and at a price which, in the midst of collieries, it would seem impossible to realize. Only this week, by the courtesy of Mr. Ferguson Bell, I am afforded another instance, both of the possibility of overcoming the suggested difficulty, and of reducing outside sales. The Derby Gas Company, after two years' work, have already developed their broken coke trade to the extent of 20 per cent.; and during the past year they have reduced their outside sales by some 7000 tons.

Mr. Kendrick refers to the fact that domestic coke is likely to be largely a winter demand, when big fires are necessary, and thinks that "the difficulty of maintaining small fires in summer will always be a deterrent to the general use of coke in houses in the North." He further asks what proportion of broken coke is sold during the summer as compared with the winter. Naturally, the summer sales are comparatively small, although not to the extent he suggests. This is, however, at a time when the ordinary trade demand for unbroken coke is relatively higher in percentage. In my own case, the quantity of broken coke (excluding smiths' breeze) sold during May, June, July, and August of last year amounted to 8 per cent. During the heavier months of this winter, when the custom was distinctly welcome, the percentage rose to well over 20 per cent.; and the percentages tend to increase. It should be remembered that, apart from domestic trade, a coke-breaking plant enables the gas undertaking to meet smithy, concreting, and other requirements which serve all the year round.

It is very desirable that the various Commercial Sections should do all they can to induce undertakings to systematically cultivate the local coke business by such means as the circumstances of the district may dictate. Coke-breaking plants are not expensive, and the smallest works can afford one proportionate to its size. The fact that the additional home custom is attended with an increased monetary return for the residual should be in itself a powerful incentive.

ROBERT WATSON.

Gas-Works, Doncaster, March 20, 1909.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF COMMONS.

The following further progress has been made with Bills:—

Bills read a second time and committed: Harrogate Gas Bill, Pontypridd Water Bill, West Gloucestershire Water Bill.
Bills reported, with amendments: Conway Gas Bill, Eastbourne Gas Bill, Littlehampton Gas Bill.
Bill withdrawn: Amman Valley Gas Bill.

On the second reading and committal of the Pontypridd Water Bill and West Gloucestershire Water Bill, it was ordered, on the motion of Mr. Courthope—"That it be an instruction to the Committee that they have power to inquire whether the promoters have made adequate provision by the Bill for the supply of water at reasonable rates to the agricultural community within the area of supply, and to any person or persons from whom any existing or natural supply is, or may be, withdrawn owing to the works or undertakings authorized by the Bill; and that they further have power to insert in the Bill such clause or clauses as they think necessary to impose upon the promoters the obligation to provide such supply." A similar instruction was ordered to the Committees on the Cardiff Corporation Bill, Llanelly Water Bill, Northallerton Water Bill, and Watford Urban District Council Bill.

The West Ham Gas Company have petitioned against alterations in the Gaslight and Coke Company Bill.

The Aldershot Gas and Water Bill, Blackwood Gas Bill, Llanelly Water Bill, Northallerton Water Bill, and Yorktown and Blackwater Gas (Electric Lighting, &c.) Bill have been referred to a Select Committee, consisting of Mr. Rose (Chairman), Sir Berkeley Sheffield, Mr. Agnew, and Mr. O'Doherty; to meet next Thursday.

The following petitions have been withdrawn: Breconshire County Council, against the Glamorgan Water Board Bill; Wandsworth Borough Council, against the Gaslight and Coke Company Bill.

EASTBOURNE GAS BILL.

House of Commons Committee.—Wednesday, March 17.

(*Before Mr.* J. J. MOONEY, *Chairman, Mr.* CARLILE, *Mr.* J. TAYLOR, *and Mr.* ALFRED KING.)

This was a Bill promoted by the Eastbourne Gas Company for authority to extend their limits of supply, to enable them to acquire the undertaking of the Hailsham Gas Company, to consolidate their capital, and for other purposes.

Mr. BALFOUR BROWNE, K.C., and Mr. HUTCHINSON appeared for the promoters. The petitioners against the Bill were represented as follows: The Uckfield District Council, by Mr. BARRINGTON; the London, Brighton, and South Coast Railway Company, by Mr. FREEMAN, K.C., and Mr. CLODE; the East Sussex County Council, by

Mr. R. S. Clease; and the Eastbourne Rural District Council, by Mr. Ram, K.C.

Mr. Balfour Browne, in opening, stated that the Eastbourne Gas Company was formed under a deed of settlement in 1852; and it was dissolved and became a statutory Company under an Act of 1868. The existing limits of supply were the borough of Eastbourne. The capital of the Company was £212,500, divided as follows: There was £20,000 in £10 shares, which were original shares and paid 10 per cent. This was authorized by the Act of 1868. There were £10 "C" shares, also to pay 10 per cent.—£12,500; and £10 shares at 7 per cent., called the "B" shares—£180,000. Therefore the Company had unissued capital to the extent of £30,294. They had also borrowing powers under the Act of 1868 to the extent of £37,500. These items together came to £68,000, which was still unexpended in the district. One of the objects of the Bill was to purchase the Hailsham Gas Company, which was a small concern supplying gas from a small works. They were also seeking to extend their limits. With regard to the consolidation of capital, he did not think there was any opposition to this. The Hailsham Company was a small one, which was authorized with a capital of only £8000, and with borrowing powers to the extent of £2000. They had so far raised £2100 in 210 shares of £10 each; and their total gross revenue amounted to about £1000. To show how small a concern it was, the Directors of the Hailsham Company only received fees of £7 7s. a year; and the Secretary's salary was only £25. The standard price of the Hailsham Company under their Order of 1903 was 6s. per 1000 cubic feet, and they were charging 5s. 5d. Their dividend had been 4½ per cent. The price in the area he represented was at present 2s. 6d. per 1000 cubic feet. In 1908, it was 2s. 8d., and recently it had been reduced by 2d., which was the lowest rate charged, he thought, by any Gas Company in Sussex. The Hailsham Company were quite willing to sell their works—in fact, they had agreed to sell them for shares in the Eastbourne Company, and the agreement was scheduled. There was a growing place on the borders of Eastbourne called Polegate; and a supply of gas was very badly wanted there. Another matter of some importance was the extension of the limits. A large district was at the present time absolutely without any gas supply at all. This was in the area of three separate rural districts. With regard to the consolidation of capital, their stock was at 10 per cent. and 7 per cent.; and what they were doing had been done in the case of a great number of companies—that was double the amount of capital and make it all 5 per cent. and 3½ per cent. It did not make any difference, because while they doubled the capital they halved the dividend upon it. It made no difference to the public; and he did not think anybody really objected to it. The opposition of the Sussex County Council and the Brighton Railway Company was not about the Bill really as it stood, but merely on some of the clauses. They wanted certain protective clauses—the Railway Company with regard to their level-crossing and their line, and the Council with regard to a main road which they might lay mains in. The learned Counsel then proceeded to deal with the petitions.

Evidence for the promoters having been given by Mr. *J. S. Garrard*, the Secretary of the Eastbourne Company, and by Mr. *G. G. Guy*, the Secretary of the Hailsham Company (who said that the desire to be purchased was unanimous on the part of the shareholders),

Mr. *H. E. Jones*, the Consulting Engineer to the Eastbourne Company, was then examined. He stated that the main purpose of the Bill was to acquire the undertaking of the Hailsham Company. Incidentally there was an intention to carry a supply to Polegate—a place of growing importance; but there was no present intention to lay mains in the western extension of the district. They would follow the line of demand, and any extension there would be wherever there was a reasonable prospect of some return for the outlay—say, 10 per cent. He strongly objected to any clause requiring mains to be laid within a given period of years, because no one could estimate what the demand might be in the future.

Thursday, March 18.

The case for the promoters having been concluded this morning, evidence was heard in opposition.

Mr. *J. F. Russell*, a member of the Eastbourne Rural District Council, described the character of the parishes, and ridiculed the idea of gas being required by labourers occupying cottages for which they only paid 1s. or 1s. 6d. weekly.

Mr. *Kirtlan*, a Solicitor, of Eastbourne, also a member of the Council, testified to a feeling in the district that gas was not likely to be required for a number of years. If and when the demand did arise, the Eastbourne works would be too distant to afford a supply at a reasonable cost.

Mr. Ram then addressed the Committee on behalf of the outlying districts; protesting against the Company being allowed to come in with absolute power to give or withhold gas as they pleased.

Mr. Barrington, on behalf of the Uckfield Rural District Council, argued for a clause requiring mains to be laid to supply Waldron within three years.

Evidence having been given in support of this view,

Mr. Hutchinson replied for the promoters.

The Chairman said the Committee would like to know whether his clients would be willing to accept a clause in reference to Waldron, laying down the three years' limit mentioned by Mr. Barrington.

Mr. Hutchinson replied that he had consulted his clients. If the Committee sought to place an obligation of this nature upon them and make the three years five, he would take such a clause. But if it were three years, he thought he would have to ask the Committee, while giving them the rest of the area, to exclude the parish of Waldron.

After consultation,

The Chairman said the Committee found the preamble proved; but they did not extend the limits to the parishes represented by Mr. Clease and Mr. Barrington. In the Bill were left in Arlington, Hailsham, Hellingly, and part of Hurstmonceau.

Friday, March 19.

Considerable discussion took place respecting a special clause submitted by Mr. Freeman for the protection of the London, Brighton, and South Coast Railway Company. Substantially it provided: (1) That all works executed in pursuance of the Act, and involving interference with the railways, bridges, roads, lands, and property of the Railway Company, and works of maintenance, repair, and renewal, &c., should be done under the superintendence and to the satisfaction of the principal Engineer of the Brighton Company, and according to plans previously submitted to, and approved by, him, or, in case of difference, to be determined by arbitration. (2) The works of interference with the railway should be done by, and at the expense of, the Gas Company, provided that if the Engineer thought it necessary that the works should be carried out by the Brighton Company that should be done at the cost of the Brighton Company. (3) Costs of superintendence of the works to be borne by the Gas Company; but such superintendence by the Brighton Company should not relieve the Company from liability for accident. (4) Compensation to be paid to the Brighton Company for injury or interruption of traffic. (5) Payment of additional expenses. (6) The Brighton Company might at any time hereafter, upon giving to the Company not less than seven days' notice, call upon them to divert or alter the level of any main, pipe, apparatus, or other work in any way affecting the railways of the Brighton Company so as to admit of any repairs or alterations of the railways of the Brighton Company which might be thought necessary. (7) The Company should not enter upon, or use for any purpose, the railways of the Brighton Company without the consent in writing of the latter. (8) Any dispute or difference which might arise between the Company and the Brighton Company with reference to the provisions of this section should be settled by arbitration by an engineer to be agreed upon between the Company and the Brighton Company, or, failing agreement, by an engineer to be appointed by the Board of Trade on the application of the Companies.

After the Committee had consulted,

The Chairman said they were of opinion that the clause ought to be inserted for the protection of the Railway Company; but they thought the period of notice which was referred to in sub-section 6 ought to be longer than seven days.

Mr. Freeman: I do not think we shall have the slightest difficulty in settling that.

Mr. Clease proposed a special clause on behalf of the East Sussex County Council, for the protection of the rights of the Council in respect of the public roads and works undertaken by the promoters.

The clause was agreed to, with an insertion, suggested by the Chairman, to the effect that "the Council should make reasonable compensation to the Company for any expense," &c.

LITTLEHAMPTON GAS BILL.

This Bill, which has for its object the dissolution and re-incorporation of the Littlehampton Gas Company, Limited, came before the Unopposed Bills Committee of the House of Commons last Thursday. Mr. Emmott, the Chairman of Ways and Means, presided; and the other members present were Mr. W. P. Beale, K.C., Mr. Caldwell, and Mr. Hills. Mr. Moon, K.C., the Speaker's Counsel, was in attendance.

Mr. Bell, the Agent for the Bill, stated its objects, and said the Company were extending their limits, and were at present supplying in part of them, but without statutory powers; and they required an Act of Parliament to put the matter right.

The Chairman asked why the Company wanted all the additional capital applied for.

Mr. *William Cash* (Messrs. Cash, Stone, and Co.) handed in a table showing the increase in the Company's business, and pointed out that in extending their limits it would be still further increased. He took it that the present capital, which worked out at £927 per million cubic feet of gas, was caused by the reconstruction of the works some few years ago. He had worked out the new business at the very moderate figure of £800 per million cubic feet. The average rate of increase had been just over 7 per cent. The Company were making provision for fourteen years, which he claimed was a very moderate amount for so small a concern. But the capital would not last so long if the additional districts they were seeking to include should yield as satisfactory a consumption as the present district did. The population in the new area was about half that in their present one. The population was about 9000 or 10,000.

In reply to Mr. Moon, witness said the Local Authorities had been considering the matter, and, after certain concessions had been made, they had withdrawn their petition against the Bill.

The Chairman: There is an amount of £45,000 of capital issued, in addition to what is unissued.

Witness replied that the unissued capital had been cancelled.

The Chairman: So that what you are asking for is another £60,000.

Mr. Moon remarked that the increase they were providing for was twice as much as their present total, which looked rather large.

Witness said that up to 1900 the progress of the Company was rather slow. In 1901 they sold 29 million cubic feet of gas, and the sale was now 47 millions. Along the south coast generally the increase was more satisfactory, owing to the desire of the people to extend the railway facilities. In addition, considerable building operations were in progress.

The Chairman said the amount asked for was too much, and a case had not been made out for the increase.

Witness said there were building operations going on along the sea-front, which was to be taken into the area. With regard to the demand for gas, the Company were not unduly pressed in the winter, but they would have a new retort-house and other alterations.

The Chairman said if they made the amounts £30,000 and £10,000 it was as much as they could do. There were certain matters in the Bill which would need to be carefully altered later, and he would then sign it.

Mr. Bell went on to say the standard price was 4s. 3d. When the Company applied to the Board of Trade in 1900 for additional capital, it was then carefully considered and settled on a sliding-scale. At

present the Company were charging 3s. 9d.; but it was necessary to have a maximum in case of strikes or accidents or an alteration in the price of coal. During the past four years the price had been 3s. 9d.; and previous to that it was 3s. 11d., and the dividend remained the same.

Mr. *Cash* drew attention to the standard prices charged by various Sussex gas companies, and said the price of the Littlehampton Company compared favourably with all of them.

Mr. BELL pointed out that the illuminating power had been increased to 15 candles because the Local Authorities wished it.

When the various minor amendments referred to by the Chairman have been made, the Bill will be ordered to be reported.

YORKTOWN AND BLACKWATER GAS BILL.

Court of Referees.—Thursday, March 18.

The Court of Referees of the House of Commons presided over by Mr. J. CALDWELL (the Deputy-Chairman of Committees) sat to-day for the purpose of considering the claim of the Wokingham Corporation to be heard in opposition to the Yorktown and Blackwater Gas (Electric Lighting), &c., Bill.

Mr. TALBOT, K.C., appeared for the Wokingham Corporation; while Mr. VESEY KNOX, K.C., represented the promoters.

Mr. TALBOT said the petition was directed to clause 5 of the Bill, under which it was proposed to extend the limits of supply of the Company to the parish of Wokingham Without. The petitioners were authorized to supply gas within the borough of Wokingham. They had carried out these powers; and they were also supplying gas to certain houses outside the borough, in the parish of Wokingham Without. They had resolved to extend the area of their gas supply so as to meet the request of residents in the parish. Under the powers of the Bill, the Company would be able to compete with the Corporation (who were also the Local Authority for the borough under the Electric Lighting Acts, 1882 and 1888) for the supply of gas in Wokingham Without, where the Corporation were already supplying, and in respect of which the Corporation had made an application for further powers—the date of the application being Feb. 12. The Corporation were prepared, should the necessity arise, to apply also for powers to supply electric energy for public and private purposes in Wokingham Without. The populous part of Wokingham Without surrounded, or was in close proximity to, the borough, and formed, with the borough, a compact area for the supply of gas or electricity. There was a large rural area extending between the existing area of the Company and the borough and the populous part of Wokingham Without; and the Corporation submitted therefore that it would be far more economical to allow them to continue the supply of gas than to permit the Company to come in and compete, which would mean a probable loss to the Company and a certain loss to the Corporation. The Corporation urged that it would be very unfair, after they had expended money on mains for the supply of houses which were really an outgrowth of the borough, and in laying larger trunk mains in the borough in view of supplying gas to the proposed extended area, to allow a Company who had no interest in the near neighbourhood to come in and deprive them of some part of the return. The Corporation therefore urged that the powers of the Bill for the supply of gas and electricity, so far as they related to Wokingham Without, should not be granted. The Corporation regarded the objection—that they had no legal right to supply in the parish as to which they were seeking statutory powers—as purely technical. The fact that they were actually supplying there, and that they had applied for a Provisional Order in respect of the area, entitled them to be constituted the supplying authority for it.

Mr. MOON, K.C. (Counsel to the Speaker), thought the *locus* must be proved, not on the ground of what the Corporation had done without powers, but by showing that they had applied to the Local Government Board for an Order enabling them to supply in the area in question, and, further, that the application entitled them to *locus*.

Mr. TALBOT held that the Corporation had *locus*, apart altogether from any question of application to the Local Government Board. As a fact, however, they had applied for a Provisional Order.

Mr. J. W. HILLS (a Member of the Court) pointed out that the date of the Corporation petition was Feb. 4, and of the application to the Local Government Board Feb. 12.

Mr. TALBOT, continuing, argued that it was the settled practice of the Court of Referees that the mere absence of statutory powers of supply did not affect a claim of *locus standi* on the ground of competition. The Corporation were obviously the proper authority to supply in the area. Here was a Corporation supplying within their borough and, though without power, outside. Then a distant Gas Company, between whose area and the parish of Wokingham Without there intervened a considerable rural area, applied to Parliament for authority to supply in the parish, including the very streets where the Corporation were supplying. Surely Parliament ought to consider whether it was convenient that the Company or the Corporation should supply there.

The CHAIRMAN said the Corporation could have presented an application to the Local Government Board for an extension of their powers; and if they had done so when they received notice of intention to promote the present Bill, and had raised the issue, by way of competing Bills, in the usual way, they would have been all right. But their petition was dated Feb. 4, and the application Feb. 12. Obviously, therefore, the application could not be relied on in the petition.

Mr. TALBOT: The application was not made until after the date of the petition; but surely when you are dealing with what ought to be considered——

Mr. MOON: But we are not. We are dealing with what the rights of people are who object to your *locus standi*.

Mr. TALBOT said it was true that the Court sat to decide whether parties had *locus standi;* but in order to see what *locus* there was, they must first see what the question was on which parties desired to be heard. The question here was whether the suppliers of gas in this area should be the Corporation or the Company; and it seemed ridiculous that, when this question was argued, one party to it should be excluded. Undoubtedly the effect of the Bill would be physical disturbance of the operations of the Corporation. Surely this was a case of direct competition. If it was held to be conclusive that the application for the Provisional Order was made some days after the petition, he could not argue further.

Mr. MOON said the Corporation were in the same position as if they had not alleged in the petition the application for the Provisional Order.

Mr. TALBOT submitted that he would be entitled to *locus* even if he had only alleged that he was about to apply for an Order. The granting of the powers sought by the Bill would undoubtedly exclude the Corporation, at any rate, until the Company had had ample time to exercise their powers——

Mr. BEALE (a Member of the Court): That is from legalizing your position?

Mr. TALBOT: Yes; and from extending it. The Corporation would not, he continued, be able to obtain a Provisional Order. There would be a Company supplying the district, and that would be an absolute bar to an Act or an Order. It was almost unknown for Parliament to give competing gas powers.

Without calling on Counsel for the promoters, the Court disallowed the *locus standi*.

LEGAL INTELLIGENCE.

THE SUPPLY OF LISTS OF SHAREHOLDERS.

Supreme Court of Judicature—Court of Appeal.—Monday, March 22.

(*Before the* MASTER OF THE ROLLS *and Lords Justices* MOULTON *and* FARWELL.)

To-day their Lordships had before them the case of *Davies v. The Gaslight and Coke Company*. It was an appeal by the defendants against the decision of Mr. Justice Warrington in December last, who held that the plaintiff, as the holder of stock in the Company, was entitled, under section 10 of the Companies Clauses Consolidation Act, 1845, to have copies of the list of stockholders with their addresses kept by the Company in accordance with the Act.*

Mr. ROWDEN, K.C., and Mr. R. J. NEVILLE (instructed by Messrs. Monier-Williams, Robinson, and Milroy) appeared for the appellants; Mr. H. TERRELL, K.C., and Mr. LAVINGTON represented the respondent.

Mr. ROWDEN said the circumstances of this case were very simple. Certain unsubstantial gas and water companies had emanated from a group of companies at No. 99, Cannon Street, where they had their offices.

Mr. TERRELL remarked that there was no evidence of this.

Mr. ROWDEN said he was not allowed to adduce the evidence. The plaintiff was the Secretary of one of these companies, who brought out a number of small gas and water undertakings which he should show were without foundation. In November, 1907, he purchased £100 of stock in the defendant Company as Secretary of a body known as the Water-Works, Lighting, and Power Investment Corporation. The Directors of the defendant Company had not the slightest wish to keep back information from any *bonâ fide* stockholder, but he submitted that the Court had a discretion in this matter; and his case was that this information was wanted for the purpose of circularizing the defendant Company's shareholders in favour of these unsubstantial concerns.

Lord Justice MOULTON: Do you say the Court has a discretion to suspend an Act of Parliament?

Mr. ROWDEN said he thought there was a discretion with regard to the particular form of relief sought in this action. The Directors thought they were doing their duty in refusing this information; and for this reason they sought a reversal of the judgment appealed against. In the Court below, he was very anxious to see the plaintiff in the box; and for this reason he did not admit certain letters. The plaintiff, however, did not go into the box; but his Solicitor did, and proved the handwriting of the plaintiff. He (Counsel), in cross-examination, then proposed to put some questions to him about a Mr. Eaton being a Director of one of these Companies; but Mr. Terrell objected, and the learned Judge said he must be convinced that such questions could be put before he could allow them. This question was argued out, and decided against him; and when afterwards he formally tendered the evidence of the Chairman of the Company, his Lordship excluded it on the same ground. He ventured to submit four propositions, from which, if they were sound, as he believed they were, it would follow that the present judgment could not stand. First he submitted that the appropriate remedy for a shareholder under such a section as the one cited, was a prerogative writ of *mandamus;* and he could refer to cases in which, under similar words, such a writ had been applied for.

Lord Justice MOULTON said a prerogative writ was only used when there was no other remedy.

Mr. ROWDEN said that was his second point. The fact that a prerogative writ was granted showed that there was no private right of action. Thirdly; he submitted that the action of *mandamus* which was first given by section 68 of the Common Law Procedure Act, 1854, was only for the enforcement of a right which could have been enforced in an action before that Act; and that in the case of a prerogative writ the Court had a discretion, and, according to the cases, would not grant it unless good cause were shown. Lastly, he submitted that, even supposing a statutory action for *mandamus* was a new right, the Court would apply the same principle, and exercise its discretion as to granting relief.

Lord Justice MOULTON: Do you say that when there is an absolute statutory right given like this, the Court may, in its discretion, refuse to enforce it?

* See "JOURNAL," Vol. CIV., p. 702.

Mr. ROWDEN said there were two cases, on the same class of section, of a shareholder or debenture holder applying for this very right; and the Court exercised a discretion. The only authorities to the contrary were the two cases of *Holland v. Dickson* and *Mutter v. Eastern and Midland Railway Company;* but they were actions for an injunction. In order to show that the prerogative writ was the appropriate remedy before the Common Law Procedure Act, Counsel referred to *Regina v. London and St. Katharine's Dock Company* and to *Rex v. Wilts and Berks Canal Navigation Company*, and said that the essence of a prerogative writ, that there was no available remedy by action, appeared from the case of the Chorley Local Board (1 Q.B., 1897).

The MASTER OF THE ROLLS said this was all very interesting; but was not, he asked, the whole point decided in the Court of Appeal in Mutter's case?

Mr. ROWDEN said he thought not; that was an injunction. Of course, if their Lordships came to the conclusion that that was a distinction without a difference, the decision of the learned Judge would be upheld.

The MASTER OF THE ROLLS said but for the decision in the Court of Appeal he should have been anxious to hear the earlier authorities fully; but he suggested that the learned Counsel had better deal with Mutter's case first, and see if it was really open to argument.

Mr. ROWDEN said in this case it was not an injunction that was asked for.

Lord Justice FARWELL said it was not a prerogative writ of *mandamus* that was sought, because this was a Chancery action.

The MASTER OF THE ROLLS said he thought, putting the word "*mandamus*" instead of "mandatory injunction" could not make any difference.

Lord Justice MOULTON suggested that the object of the Common Law Procedure Act was to bring the remedy by injunction, whether mandatory or otherwise, into the Common Law. It was never intended that the *mandamus* which was sued for in an action was anything other than a mandatory injunction.

Mr. ROWDEN said his argument on this point might be summed up in one sentence taken from a judgment of the late Mr. Justice Wright in the case of the Vestry of St. George's, Southwark, where he said it was very doubtful whether the provision of a *mandamus* given either by the Common Law Procedure Act or by the Judicature Act extended at all to any relief that could not have been obtained in an action before the Common Law Procedure Act, and whether the remedy so given was not intended really as an additional mode of enforcing the judgment which the Court had power to give.

Lord Justice MOULTON said the learned Judge must have meant to include an action in the Chancery Division, as in the Common Law Division one could not have had an injunction. What he meant was that an injunction, whether mandatory or not, which would be granted in Chancery, could now be obtained at Common Law.

Mr. ROWDEN said his answer to Mutter's case was really twofold. First, it was not an action for *mandamus*, but only for injunction; and, secondly, if this were the appropriate remedy, the Court would do as it did under the same head of relief—exercise its discretion.

Lord Justice FARWELL said the argument that the granting of a prerogative writ was discretionary did not apply in this case, because the Court of Chancery could not entertain a prerogative writ at all. It was simply a question whether on this writ in the Chancery Division a mandatory injunction could be granted.

The MASTER OF THE ROLLS expressed the opinion that before the Common Law Procedure Act the Court of Chancery would, under section 10, have granted this Order.

Lord Justice MOULTON said he could not conceive a better ground for a mandatory injunction than a statutory right. The Court of Chancery granted it sometimes when there was only a contractual right.

Mr. ROWDEN submitted that in all the practice books a *mandamus* was said to be the proper way of enforcing a shareholder's right to see the register.

Lord Justice MOULTON said this went to show that Mutter's case was wrong, because there the right was enforced by an action in Chancery. Really this was an action in a Chancery suit for a mandatory injunction. It had nothing to do with a prerogative writ, which was a limited method of doing what the Court of Chancery did much more effectually.

Mr. ROWDEN said his main point was that in this form of action that discretion which was always used in a prerogative writ ought to be imported. The only ground on which he could distinguish this case from Mutter's was that this was a *mandamus* and that was an action.

The MASTER OF THE ROLLS remarked that a *mandamus* had not been granted.

Mr. ROWDEN said the learned Judge no doubt moulded his order in the form of an injunction. He was not complaining of the form but of the substance; but if their Lordships did not accede to his view that Mutter's case was not applicable, it was no use pursuing the argument further. He only wished to say that the Chairman and Directors of the appellant Company had not the slightest wish to prevent shareholders getting information.

Lord Justice MOULTON said they fully appreciated this.

Mr. NEVILLE said he should like to add a few remarks. He would point out first that, with regard to an action for *mandamus*, there was a special rule entirely separate from the rules with regard to injunctions; and this very fact showed that the distinctions which were introduced by the Common Law Procedure Act were intended to be kept up. The two cases pressed against him clearly showed that there was a remedy by way of injunction; and if he was right, an action for *mandamus* would only lie where there was no other available remedy. He therefore claimed *Holland v. Dickson* and Mutter's case to be in his favour, and that this action for a *mandamus* ought to have been dismissed, on the ground that there was another remedy.

Lord Justice MOULTON said the writ claimed a *mandamus*, costs, and further relief—in effect, a mandatory injunction.

Mr. NEVILLE went on to urge that the action for *mandamus* was introduced by the Common Law Procedure Act; and he read passages from the report of the Commissioners on which the Act was based. Reverting to Mutter's case, he pointed out that the Court there did consider the motives of the applicant, and held that they justified him; and he asked the Court to say here that the motives were quite different—wholly unconnected with the interests of the Company, and did not justify the application.

Lord Justice MOULTON pointed out that the words of section 10 were absolute; they said nothing about purpose or motive. They had no right to read a qualification into the section.

Mr. NEVILLE again submitted that the same principles applied as in the case of a prerogative writ. In reply to his Lordship's suggestion that the words were absolute, he said he would refer to *Regina v. Governor of the Bank of England*. Under section 52 of the National Debt Act, 1870, the Bank of England was directed to keep a list of unclaimed stock, which was "to be open for inspection at the usual hours of transfer"—words quite as absolute as those in section 10, and no qualification whatever. But when a next-of-kin agent applied, for the purposes of his business, to see the list, he was refused; and, on an application for a *mandamus*, the Court held that, as the applicant did not show that he had a *bonâ fide* claim to an interest in any unclaimed stock, he was not entitled to inspection.

Lord Justice MOULTON: The Court said you may have the right, but we have the right not to help you; and we will not. There the applicant was going for a prerogative writ; here it was for a mandatory injunction in Chancery.

Lord Justice FARWELL said the learned Judge had taken the view that the plaintiff was asking for a mandatory injunction.

Lord Justice MOULTON said it would only cost a few shillings to amend the writ by adding a claim for amandatory injunction; and this was what the learned Judge had taken to be done, if necessary.

Mr. NEVILLE submitted that the Court did not intend in Mutter's case to lay down a general rule that it would never inquire into the circumstances or the motives of an applicant.

Lord Justice MOULTON thought motives could not matter.

The MASTER OF THE ROLLS: Why should not a man circularize? The shareholders have waste-paper baskets, I hope.

Mr. NEVILLE, in conclusion, submitted that the Court would consider whether it was just and convenient in the present case to grant the injunction.

The MASTER OF THE ROLLS said in his view it was just and convenient to give the plaintiff his statutory rights.

Mr. NEVILLE said he could not carry the matter any farther.

Without calling upon Counsel on the other side, their Lordships proceeded to deliver the following

Judgment.

The MASTER OF THE ROLLS: This is an appeal from the decision of Mr. Justice Warrington, and it raises a point on which, apart from authority, I do not think I should have found any difficulty, but which in my view is absolutely concluded by authority. More than twenty years ago, Mr. Justice Chitty in *Holland v. Dickson*, in a case in which, under this very section, or under a corresponding section as to debenture stock—I am not certain which, but there is no distinction between the sections—made an order, notwithstanding that the point was clearly taken before him, that where, as is here alleged, a company or a public body is failing to perform a duty, the remedy is by *mandamus* and not by action for injunction. Mr. Justice Chitty said: "This is simply a case of a private owner of stock with a statutory right to see the books, and of interference by the defendants with that statutory right. It seems to me to follow that, when the statutory right of an individual is interfered with, an injunction would have been granted by the old Court of Chancery, and at any rate ought now to be granted by our Court." I accept this as a perfectly true and accurate statement of the law. In the same year, and very shortly afterwards, the point came before the Court of Appeal in Mutter's case. There again the point was raised that Mutter, the plaintiff, was really interested in an adverse Company—the Great Eastern Company; that it was not an application made in good faith; and that there were good grounds, if it had been an application for a prerogative writ of *mandamus*, for refusing it. But both Mr. Justice Chitty and the Court of Appeal declined to take that view. Lord Justice Lindley, who gave the judgment of the Court (the other members really adding nothing to it, and saying it was their judgment), points out quite clearly that the fact "that the plaintiff had taken both shares and debenture stock at the instance of a rival company was made out. But at the same time he is unquestionably, in point of law, both a shareholder and a debenture stock holder; and therefore he has the rights, whatever they may be, of a shareholder and debenture stock holder, and whether he is a trustee for other people we cannot inquire." What are those rights? The rights are given by section 10 of the Companies Clauses Act. The company is to provide a book, called the shareholders' address-book; and every shareholder may, at all convenient times, peruse such book gratis, and may require a copy thereof, or any part therof, on payment of a certain fee of 6d. for 100 words. His right seems to me to be perfectly clear. That right does not depend upon the motives he may have for exercising the right; he is a shareholder who desires to exercise it. It seem to me quite clear that the old jurisdiction of the Court of Chancery is still in force, and that that which in old days would have been called a mandatory injunction, taking a negative form, ought now to take the form which Mr. Justice Warrington has given it by his order—namely, a positive order to do that which they are obliged to do by statute. Then it is said that the writ is endorsed for a *mandamus*, and we are asked to say that this can only be supported if it was an action for a *mandamus* under the Common Law Procedure Act. I entirely decline to read it in that way. I think, with the facts before him, the learned Judge was perfectly entitled—nay, bound—to give the relief which he did give, which was a relief well established in the old Court of Chancery, and consistent, in my view, with the plain language of section 10. But I adopt as really the keynote of his judgment the passage in which he says: "In the present case, I am of opinion, on the two authorities of *Holland v. Dickson* and *Mutter v. Eastern and Midlands Railway Company*, that the action will lie. I can find no distinction in principle between granting an injunction to restrain a company from interfering with the right, and granting an affirmative order compelling a company to grant the right." In my opinion, this appeal must be dismissed, with costs.

Lord Justice MOULTON: This is an action in the Chancery Division, in which the plaintiff sues for a mandatory injunction, not inaptly or incorrectly called a *mandamus*, to compel the Company to grant to him certain private rights to which he is clearly and confessedly entitled by the language of section 10 of the Companies Clauses Act of 1845. Not a shadow of answer or defence is suggested; but the Court is asked to refuse to exercise its powers to secure for the plaintiff this his legal right. I can see no possible reason for not giving him the relief he asks; and even if I had any doubt about it, as the Master of the Rolls says, it is decided, and we are bound by authority on the point. But I must confess I do not feel the slightest need to have recourse to that authority to base my judgment upon. The arguments of Counsel have been entirely based on a confusion with proceedings on the Common Law side—chiefly proceedings for the purpose of the extraordinary remedy of the prerogative writ of *mandamus*. In my opinion, all that has nothing whatever to do with the question before us. I am of opinion that this appeal is wholly unsustainable, and should be dismissed.

Lord Justice FARWELL said he agreed, and had nothing to add.

The appeal was accordingly dismissed, with costs.

POSITION OF THE AMMAN VALLEY GAS COMPANY.

Application for the Appointment of a Receiver.

In the Chancery Division of the High Court of Justice last Friday, Mr. Justice Parker had before him a motion for the appointment of a receiver in an action by holders of debentures of the Amman Valley Gas Company.

Mr. THOMPSON, who appeared for the plaintiffs (Messrs. R. & A. Main, Limited), said they were holders of 73 debentures, representing £730, out of a total issue of £12,500. When he mentioned the motion a week ago, his friend Mr. Ward Coldridge appeared for the Company, and asked that the matter might stand over; but he now informed him that he had no brief. The defendant Company was formed to manufacture and supply gas at Ammanford, in Carnarvonshire; and the works were formally opened, with some ceremony, about two years ago. But the Company had never done any business, or supplied any gas; and it was believed to be insolvent. There was also litigation pending against the Directors, on an allegation of fraudulent misrepresentations in the prospectus. The principal money under the debentures was not technically due; but he moved on the ground of jeopardy. Having read the evidence, which showed that arrangements had been made by defendants to pay the judgment debt by yearly instalments of £50, with interest at 5 per cent., which was not carried out,

Justice PARKER pointed out that there was no evidence that the Company had any property of which a receiver could take possession. How could he say that the assets were in jeopardy when there was no evidence that there were any?

Mr. THOMPSON said he should ask his Lordship to infer that there were some assets. He did not ask for a manager, as there was no business to manage; but the Company had certainly charged all their property, and it might be inferred there was something to protect.

Justice PARKER remarked that there was no evidence that anybody was going to attach it. He gathered that the pending action was not against the Company, but against the Directors—probably on behalf of the Company.

Mr. THOMPSON, after referring to the Statement of Claim, said the action was brought by Mr. Price against the Directors, against a certain other Company, and against the Amman Valley Gas Company as co-defendants.

After some further discussion,

Justice PARKER said the motion had better stand over for a week, for Mr. Thompson to see if he could strengthen his evidence. He had also to consider the other debenture holders, with whom the present applicants might communicate. Some of them might have given notice, so as to make the money immediately due.

ACTION AS TO BRENTFORD GAS COMPANY'S SHARES.

In the Chancery Division of the High Court of Justice last Wednesday, an action which was tried by Mr. Justice Swinfen Eady on Jan. 18, 1908, and reported in the "JOURNAL" at the time, was again before his Lordship by way of summons to vary the Master's certificate. By the order made at the trial, an inquiry was directed with regard to the ownership of some consolidated stock of the Company represented by two of the old shares. As the result, it appeared that one share had been transferred to R. Hall and the other to John (or James) Russell; but their representatives could not be traced, and no transfer had been tendered for registration. The Company was established in 1821 by John and George Barlow, who were the Contractors for the construction of the works; and they received £7000 in shares, which were hypothecated with the Company to secure the payment of a dividend of 7½ per cent. to the proprietors. The Barlows afterwards got into financial difficulty, and entered into an arrangement with their creditors by which their shares in this and other gas companies were distributed as specie. The two shares in dispute were allotted as mentioned above; but inquiry had failed to trace their representatives. Mr. Macnaghten, K.C. (with him Mr. Maughan), submitted that the plaintiff George Dudley Barlow, as the legal personal representative of John and George Barlow, was entitled to be registered as the proprietor of the shares, leaving the representatives of Hall and Russell, if they ever came forward, to enforce such rights as were properly attributable to transferees who had stood by for upwards of eighty years. Mr. Micklem, K.C. (with him Mr. Cook), for the Company, said his clients were ready to act in the matter as the Court might direct. His Lordship said it was clear that John and George Barlow became entitled to the shares by the minute of the Company of June 1, 1824, which directed that the hypothecated shares should be returned to them. It was true that down to the present time no transfer had been presented to the Company for registration; but the plaintiff had made out a proper title from the original allottees of the shares. If at some future time a transfer was presented for registration, the claim would have to be considered, especially as the Statute of Limitations did not apply. He ordered the Company to register the two shares in the name of the plaintiff, and to deduct from the unpaid dividends their costs as between solicitor and client.

The Johannesburg Gas Plant Contract.

In the First Division of the Court of Session on Friday, decision was given in a reclaiming note against the judgment of Lord Mackenzie in the action relating to the contract for the supply of gas-producing and electrical plant for Johannesburg (*ante*, p. 322). The Municipal Council of Johannesburg sued Messrs. D. Y. Stewart and Co. (1902), Limited, of Glasgow, and the representative of the late Mr. J. Beardmore, of Glasgow, for £400,000, for failing to carry through their contract. Mrs. Beardmore pleaded, in defence, that her husband was only a guarantor; and besides, that she was not subject to the jurisdiction of the Court. Lord Mackenzie dismissed the action as against her. The principal defence is that the contract provided that the High Court in England should have jurisdiction in all matters under it, and that differences should be referred to an arbiter appointed under the law of England. Lord Mackenzie sent the case for arbitration under the law of England. The Council reclaimed; and the decision of the Inner House on Friday was that a case be stated for the determination of the English Court, to ascertain whether the arbitration clause is valid and covers the question in dispute. The action against Mrs. Beardmore was again dismissed; the question of the liability of guarantors not arising until that of the principals has been determined.

A Case of "Gassing" at Droitwich.

At the Droitwich County Court, some days ago, his Honour Judge Ingham heard an application by a Mrs. Harrison for compensation for the death of her husband. Harrison and a man named Price were at the bottom of a hole tapping a gas-main; and a rush of gas followed the passage of the drill, and both men were asphyxiated—Price being apparently the worse, and remaining the longer time under the influence of the gas. Harrison, though very badly affected, was able to stagger home, and next day to resume work, though he was never well again, and about a fortnight afterwards died. Medical evidence of the effects produced by gassing was given; and it was shown that these effects were present in deceased's condition. The doctor, however, while testifying that all his symptoms were consistent with gas poisoning, and not disagreeing with the verdict of the Coroner's Jury, said the actual cause of death was, in his opinion, cerebral clotting of the blood, in which, no doubt, the poisoning was a factor; but that, unless an actual examination of the viscera and a microscopic examination of the blood had been made, he could not say that deceased died of gas poisoning. Evidence of deceased's previous good health was given; but Mr. Cave, for the Corporation, elicited the fact that the man had the previous May suffered from gassing, though he recovered promptly. Mr. Cave then submitted that gassing was not scheduled as a dangerous disease in the schedule to the Act; that it was therefore a common risk which all gas employees ran; and that its effect upon the system could not be treated as an "accident" within the meaning of the Act, even where, as in this case, there was a sudden taking in of gas to the system. He relied upon a decision of the High Court in the case of a workman who had died from sewer gas poisoning. Mr. Coventry, for the plaintiff, submitted that the man's death resulted from gas poisoning; and that the sudden inrush was the accident upon which he was entitled to rely. He cited a case of heat stroke to a marine stoker, also decided by the High Court, as supporting his views. His Honour said that, in view of the medical evidence which had been given, he could not hold that the death was the result of gas poisoning by accident within the meaning of the Act, and that, if it was, he was bound by the decision of the High Court in the sewer gas case. He must therefore decide against the claim.

Water Supply to Theatres.—Representations have been made to the London County Council by the Theatres Alliance in regard to the charges made by the Metropolitan Water Board for the supply of water to places of public entertainment; and a report on the matter by the Theatres Committee appears on the *agenda* for the meeting of the Council to-day. It is pointed out that theatre proprietors are now being charged 5 per cent. on the rateable value of their premises, less a rebate of 20 per cent. if certain conditions are fulfilled. This charge does not, however, cover any unusual or uncommon consumption of water. For instance, the Board insist on an additional payment of one guinea a year for each hydrant installed in a theatre, though the hydrants are sealed and no water is used unless there is a fire. As the Board propose to institute proceedings for the recovery of the outstanding charges, the proprietors have urged that, as they are placed in their present unfortunate position by reason of the Council requiring them to instal hydrants in their premises, the Council should, if they cannot see their way to allow a metered supply, make representations with a view to inducing the Board to accept their proposal. In regard to the question of allowing the supply of water to hydrants in places of public entertainment to pass through a meter, the Committee are advised that, if this were done, the efficiency of the hydrants would be very seriously diminished, and they are therefore unable to recommend the Council to allow it. They have carefully considered the suggestion that the Council should make representations to the Board, and, while they feel that the position is one of considerable hardship, they are of opinion that they cannot usefully intervene in the matter.

MISCELLANEOUS NEWS.

THE GASLIGHT AND COKE COMPANY'S BILL.

The London County Council Opposition to be Withdrawn—Concessions by the Company—A Test for Calorific Power to be Established.

At to-day's Meeting of the London County Council, an important report from the Parliamentary Committee will be submitted which (if adopted) will lead to the withdrawal of the Council's petition against the Company's Bill. The report is as follows.

Under the authority given by the Council on the 2nd ult., a petition was presented against the Gaslight and Coke Company's Bill which has been introduced into Parliament in the present session. The Bill proposes to authorize the acquisition by the Gaslight and Coke Company of the undertaking of the West Ham Gas Company, and to reduce the illuminating power of the gas supplied by the Gaslight and Coke Company from 16 to 14 candle power. The Council has always contended, and Parliament has recognized, that where a saving in manufacture is due to some alteration of a previous parliamentary requirement, and not solely to the exercise of due care and management on the part of the company, the entire saving should enure to the benefit of the consumers, and that the shareholders should have no share in it. Under the slidingscale of the Gaslight and Coke Company the shareholders are entitled to 2s. 8d. per cent. increase in dividend for each 1d. reduction in the price of gas charged below the standard price of 3s. 3d. If the standard price remains unaltered, the Company will be able to increase their dividend by reason of being able to supply a lower quality of gas costing less to produce. To secure the benefit from the saving in cost of manufacturing the lower candle power gas for the consumer, it is necessary for the Council to obtain a reduction in standard price equal to the saving due to the supply of gas of lower candle power.

The following were the most important points raised in the Council's petition against the Bill—

(1) That there was no proposal in the Bill for a reduction of standard price in consideration of the proposal of the Company to reduce the illuminating power of the gas from 16 to 14 candle power.

[The Council on the 16th of July, 1907, assented to the reintroduction of meter-rents by the Company on the Company giving an undertaking that the dividend would in future be calculated as if the standard price were 1d. less—this undertaking to continue until embodied in the next Bill to be promoted by the Company. To give effect to this undertaking, the Bill provides for a reduction of 1d. in the standard price; but no reduction of standard price is offered in return for the proposed reduction of candle power.]

(2) That, in view of the increasing use of gas for heating purposes, and for lighting by means of incandescent mantles, the time had now come when a standard of calorific power for gas should be fixed, and that the Company should be liable to forfeitures for any deficiency in such standard.

(3) That, if the proposed reduction of illuminating power were sanctioned, the Company should be required to supply to consumers and fix free of charge, burners suitable for the consumption of gas of 14-candle power.

(4) That it should be made clear in the Bill that the price charged by the Company for gas of 14-candle power south of the Thames shall be the same as that charged by the South Metropolitan Gas Company for gas of the same illuminating power, in accordance with the Amalgamation Scheme of 1883; and that the price for public lighting in the whole of the Company's area shall be the same as the Company's lowest selling price to any consumer.

(5) That the Company should be required to give the Council notice of intention to lay new or alter existing mains and pipes in any street in which there is an existing or authorized tramway of the Council.

We have been in communication with the Public Control Committee on the provisions of the Bill, and their views are embodied in the points set out above. Before entering into negotiations with the Company with a view to ascertaining to what extent the Company might be prepared to meet the Council, we retained the services of Dr. Frankland, Professor of Chemistry of Birmingham University, and Mr. Charles Hunt, Consulting Gas Engineer, of Westminster, to advise the Council. We also obtained reports from the Comptroller and the Chemist of the Council. As the result of interviews which our Chairman and the Chairman and late Chairman of the Public Control Committee had with representatives of the Company, the Company agreed to make the following concessions:

The standard price to be reduced by another 1d.—*i.e.*, from 3s. 3d. to 3s. 2d.

A standard of calorific power of 125 calories net to be established; the tests being taken on an average of three days, and subject to a margin of 10 per cent. being allowed before any penalty is incurred—the whole arrangement being subject to revision by the Board of Trade on the request of the Council or the Company at the end of every three years.

In addition, the Company agreed to meet the Council on (3) and (4). The Company declined to agree to a clause being inserted in the Bill as to the laying of mains in streets in which there are existing or authorized tramways, on the ground that the Company were already required to submit plans, &c., to the Borough Councils as road authorities, and they could not consent to alter the general law; but the Company agreed that their Engineer should notify the Chief Engineer of the Council whenever he proposes to lay any new mains in such streets. We carefully considered the matter, in conjunction with representatives of the Public Control Committee and the experts, and came to the conclusion that the concessions which we induced the Company to make were satisfactory. In the first instance, the Gas Company were asked to concede 2d. reduction in the standard price in consideration of the illuminating power being reduced by two candles. The representatives of the Company stated, however, that the Company were prepared to prove that the saving in the cost of manufacture effected by the reduction of illuminating power would not be more than ¾d. We are advised by our own experts that the reduction in illuminating power would not effect a saving of one penny in the cost of manufacture. The Council could not, therefore, fairly ask for more than 1d. reduction of the standard price. We think that it is a distinct advance that the Council has been able for the first time to obtain the insertion in an Act of Parliament of a standard of calorific power, and this is of the utmost importance, having regard to the extent to which gas is now used for cooking and heating purposes. We are advised by the experts that the standard is a fair one; and it will be subject to periodical revision by the Board of Trade. An arrangement has accordingly been entered into with the Company on the terms indicated above, and effect will be given to this arrangement by provisions to be inserted in the Bill and the Council's opposition will be withdrawn.

GAS PROFITS AT LEICESTER.

At a Special Meeting of the Leicester Town Council last Tuesday, in moving the adoption of that part of the Gas and Electric Lighting Committee's report which related to the gas undertaking, Mr. Jennings said the statement, though not a record one, was to the Committee very satisfactory. They had found that during the past year their residuals had not realized anything near the money that they used to. He was glad to say they had fulfilled all that they had promised to the Council, and had gone a little bit beyond; and this had brought the total handed over from the Gas Department to relieve the rates to £688,952. As to the revenue account for the past half year, the principal sources of income were: Sales of gas, £117,163; and residuals, £33,632. This was about £6000 less than in the corresponding half of the previous year. The total income was £153,268. The working expenses were £108,925; and the total gross profit was £44,833. From this they had paid interest £20,679, and sinking fund £7651, the net profit therefore being £16,502, against £17,562 for the first half year—making the total net profit for the year £34,065. Though the profits had gone down, it was not because the industry was falling off. During the year they had taken on 1117 new customers, most of them being for slot meters. Slot meters, by the way, were steadily on the increase, and the ordinary meters on the decrease. The increased gas output for the year was to the value of £5113, about 2¼ per cent. In conclusion, he was quite sure the Council would be very pleased indeed to know that, though such weather as they had lately been having would at one time have meant great trouble as regarded naphthalene complaints, they had not had one single case. What was more, since their Engineer (Mr. Alfred Colson) got rid of the nuisance five years ago, no trace of naphthalene has recurred either at the works or anywhere throughout the district; and to-day, as for these years past, the undertaking was absolutely free. Not only did this mean considerable trouble and annoyance saved to the consumers, but it naturally represented a great saving of expense to the undertaking.

In the course of some discussion which followed, Mr. Walker said he thought they should see more profit from the Gas Department. The return amounted to less than 4 per cent. on the capital; and they had to charge the consumers 2s. 4d. per 1000 cubic feet for lighting and 1s. 6d. for power. Mr. Jennings, however, replied that Mr. Walker was quite out of it. Last year they made £90,000 in round figures; and out of this they had paid more than £40,000 for interest, which would not have been paid if it had been a company concern. They would find the dividend was much more than 4 per cent., if they reckoned it up, especially as Mr. Walker was calculating the capital as still £1,250,000, whereas it was now really only a little over £900,000.

The report was adopted.

THE SUPPLY OF GAS TO OUT-DISTRICTS.

Application to the Salford Corporation by the Prestwich District Council.

A public meeting convened by the Chairman of the Prestwich Urban District Council was held last Friday evening in the Warwick Street Hall in that town, for the purpose of considering the question of the gas supply. At present part of the district is supplied by the Radcliffe and Pilkington Gas Company, and the other portion by the Salford Corporation. At a recent meeting of the District Council, a resolution was adopted inviting the Salford Corporation to obtain powers to supply the whole of the district; and last Friday's meeting was asked to support this resolution.

It was explained by Councillor Chorlton that the difference in price between the gas supplied to the lower portion of the district and that furnished by the Radcliffe and Pilkington Gas Company was on the average 6d. per 1000 cubic feet. As to a suggestion made, that one way of remedying the present state of things was for the Council to put down gas-works of their own, Councillor Chorlton pointed out that the price at which gas could be made depended to a great extent upon the area supplied, and a small authority would be hampered in this respect. Then, before this could be done, they would have to promote a Bill in Parliament to acquire the necessary powers. An alternative was to get some neighbouring authority to supply the district with gas; and the Council favoured the Salford Corporation, as they had already supplied a portion of the district. Councillor Greenhalgh agreed that to supply gas themselves was out of the question at present, but said it might not be so twenty years hence. Therefore he advised that care be taken in drawing up any agreement with Salford so that they might at some future time be able to free themselves.

Some discussion took place as to Salford's proposal to reduce the

candle power of the gas supplied; and it was suggested by one of the speakers that if the illuminating power was reduced, the price should be also lowered.

Councillor Sharp said he opposed the proposal to approach the Salford Corporation, because they did not appear to be getting any guarantee as to what the price would be under that authority. In reply, Councillor Chorlton said a promise had been given that if Salford did reduce the candle power there would be a reduction in price; but if the candle power was not lessened, there would probably be an increase in the charges, owing to the scarcity of cannel.

A resolution was carried approving of the Council approaching the Salford Corporation and arranging for that authority to take over the supply of gas to the whole of the Prestwich Council's area.

YORKTOWN AND BLACKWATER GAS COMPANY.

Fifty Years' Progress—The Supply of Electricity.

The Annual General Meeting of the Yorktown and Blackwater Gas Company, held on the 11th inst., under the presidency of Mr. A. H. Claypole, J.P., was of more than usual interest, as this is the jubilee year of the undertaking. Before moving the adoption of the report, the Chairman gave the following account of the origin and progress of the concern: The Company was incorporated on Feb. 18, 1859, with a capital of £1500, in 600 shares of £2 10s. each. The works were very small; the gasholder having a capacity of only 6000 cubic feet. The works staff consisted of one man; and a 4-inch main sufficed for the supply of the product. The first dividend, at the rate of 5 per cent. per annum, was paid in 1867; and the Company had been a dividend-paying concern ever since. For many years they pursued a steady course; but in 1903 a more rapid forward movement commenced, and it became necessary to practically reconstruct the works. The Directors took the matter in hand, and, under the able direction of their Engineer (Mr. John Meiklejohn), the necessary changes were satisfactorily carried through, the mains extended to other parts of the district, and the works brought up to the requirements of the neighbourhood. For more than forty years—from 1859 to 1901—the Company was the only one supplying gas in the parish of Frimley. Now they served about three-fourths of the population; and at the end of the next fifty years he trusted they might still be found providing satisfactorily for the public needs, and paying a fair dividend to the shareholders. The Chairman then proceeded to deal with the accounts for the past year, which showed a balance available for distribution of £6065, compared with £4714 last year. The Directors recommended payment of dividends making with the interim dividends 12½ per cent. per annum on the original shares, and 8 23-40ths per cent. per annum on the additional shares. Before concluding, the Chairman stated, with regard to the Bill the Company are promoting this session, that some of the serious opposition had been withdrawn, and they hoped negotiations, which were still pending, might result in further settlements by arrangement. As to the supply of electricity, the Directors five years ago began to consider the question. They recognized the probability that the district would before long be requiring electricity; and they considered that the Company were in an exceptionally good position to furnish it efficiently and economically. It was difficult to see any valid reason why gas and electricity should not be supplied by the same Company. The economical advantages of doing this were considerable, especially so in their case, where the local conditions were so favourable. He concluded by moving the adoption of the report; and the motion was carried unanimously, without giving rise to any questions or comments. The retiring Directors and Auditor were re-elected; and thanks were accorded to the officials and Directors. With the acknowledgment of these compliments the proceedings closed.

Non-Payment of Lighting Rate.

Proceedings were taken at Coventry on Friday against a number of Foleshill ratepayers for non-payment of amounts due under the Lighting Act; but it was agreed to take one case only. Mr. J. Haymes appeared for the Foleshill Parish Council, and detailed the steps taken to put the Act into operation in the Longford Ward of the parish. He said a meeting of the ratepayers was held, in pursuance of a requisition, on July 21, 1908; and the resolution adopting the Lighting Act was duly passed. It was explained that £115 would be required for the lighting of the ward in question for one year; and a clause of the Act mentioned that the Overseers were the persons to make the lighting rate, which was to be levied in exactly the same way as the poor rate. The Overseers made the rate accordingly; and it was duly signed and allowed by the Magistrates. Mr. J. F. Eales, who appeared for the defence, said it was his contention that the rate was bad, because the Act was not properly adopted. Mr. H. O. Gutteridge, Rate Collector and Clerk to the Council, gave formal evidence, and said the amount due from one defendant, whose case was taken as a sample, was 6s. 8d. Mr. Eales stated that the defendants objected to paying the rate, on the ground that they derived no benefit. In one instance, the defendant lived a mile away from a street-lamp. He also argued that the necessary two-thirds majority in favour of the adoption of the Act was not obtained at the meeting. The Bench, however, made an order for the rate to be paid.

A Manchester Gas Poisoning Victim.—In the case of Emma Cooling, wife of the landlord of the Wellington Hotel, Manchester, a Coroner's Jury returned an open verdict. Mrs. Cooling was found in one of the bedrooms unconscious, and suffering from gas poisoning, from which she died subsequently. According to a doctor who was called in, the body showed signs of alcoholic excess, and death was owing to pneumonia, indirectly due to gas poisoning. The husband said that his wife had had a few drinking bouts; the last being about a fortnight previously. When he broke open the door of the bedroom, he found the apartment full of gas, which was escaping from the jet; the tap being turned half on.

SOUTH METROPOLITAN COMPANY'S RATING APPEALS.

Woolwich Guardians Surcharged £143 16s.

At the Woolwich Union Offices, Plumstead, on Friday, the 12th inst., Mr. H. D. Gordon, one of the Local Government Board Auditors, resumed his audit of the accounts of the Woolwich Union for the year 1907-8. The circumstances under which the South Metropolitan Gas Company applied for a surcharge against the Guardians with respect to certain payments made by them to Messrs. Dinwiddy and Sons at the last quinquennial valuation have already been explained. It may be remembered that at a hearing on Jan. 21 (*ante*, p. 253), Mr. Gordon expressed his intention of disallowing £127; and the hearing was adjourned to enable Mr. Pasmore, of Messrs. Hicklin, Washington, and Pasmore, the Solicitors to the Company, to substantiate his claim for further reductions. On the present occasion, no representative appeared on behalf of the Company; but Mr. Conrad Dinwiddy was in attendance.

Mr. Gordon said the total of the bill of costs presented against the Company by Messrs. Dinwiddy, in respect of the Woolwich appeals alone, was £997 18s. 6d. On taxation, it was reduced to £151 17s. 6d., which was paid by the Company, and the taxed-off balance by the Guardians. He had now finally decided to surcharge the Guardians with the sum of £143 16s. Of this sum, £120 12s. was in respect of days of work charged for at the full amount mentioned in the contract, though on these days Messrs. Dinwiddy were also employed on the business of other boroughs involved in the appeals. On the charge for attendances £7 7s. would be disallowed; a large number of letters charged at 5s. each would be priced down to 3s. 6d., making a further disallowance of £10 17s.; and £5 would be disallowed in respect of a printer's bill.

Mr. G. R. Hunter, the Chairman of the Board of Guardians, addressed the Auditor in justification of the action of the Guardians. He stated that when the last quinquennial period was approaching his Board entered into a contract with Messrs. Dinwiddy not only for valuations but also for work in connection with appeals, and arranged terms for attendances and the whole of the services they might be called upon to render. He was advised that the contract was framed on the lines of those made for 25 years past; and his own opinion was that it was valid and binding. Whether or not it was a wise one was another matter; but it appeared to him that the Board had no choice but to pay. The Guardians took proper precautions, used all diligence, and acted honestly and straightforwardly; and, believing that the charges of Messrs. Dinwiddy were legal, reasonable, and proper, they held that no part of them should be disallowed. He added that they did not intend to shelter themselves behind their officials. They took their advice, believing, as they still believed, that they were right. But they knew this did not protect them if the advice was wrong.

Mr. Dinwiddy reminded the Auditor that he was in possession of a letter from their firm which set forth clearly what Mr. Hunter had been saying—that the accounts were exactly according to contract.

The Auditor intimated that he was going to hand the notice of surcharge, without which mere disallowance would be inoperative, to the Clerk, as he was going to advise the Board.

The Clerk (Mr. Tom Cutter), speaking with great warmth, characterized the proceedings as "the biggest scandal on the face of the earth." He said the Guardians made an assessment which was sustained; and it was scandalous that they should now be told that they should have entered into an agreement with people who compromised, and have accepted half an assessment.

Mr. Gordon remarked that he had practically received notice that the Gas Company intended to intervene, and carry the matter further. He himself, however, had no option in the matter.

GAS SUPPLY IN THE COLONIES.

Contemplated Extensions at Auckland.

The Directors of the Auckland (N.Z.) Gas Company, Limited, reported to the shareholders, at the recent annual meeting, that the profits for the year ending Dec. 31 last, after deducting working and management expenses, the cost of repairs and renewals, interest, bad debts, and other charges, amounted to £40,620; the total revenue having been £126,583, and the expenditure £85,963. They recommended a dividend for the second half of the year of 8s. 6d. per share on the fully-paid shares, and a proportionate dividend on those on which 5s. has been paid. These, with the interim dividend, amounted to £31,177, and left £9443 to be carried forward. In moving the adoption of the report, the Chairman (Mr. J. H. Upton) said the Directors had again to record a gratifying improvement in the Company's business. The total make of gas had been 504,225,000 cubic feet, which was an increase of 59,309,300 cubic feet, or 13·3 per cent., over the previous year's production. The sale of gas had produced £105,013, an increase of 7·9 per cent., while residual products had yielded £20,286, or 5·1 per cent. more than before. These results were most gratifying, and showed a high appreciation on the part of the public of the value and convenience of gas lighting. The mains had been extended 11½ miles; making a total of 238 miles. The present works were designed for a make of about 2 million cubic feet per day, and the consumption was approaching this limit; consequently, in a year or two further extensions would have to be considered. Their Engineer (Mr. James Lowe, Assoc.M.Inst.C.E.) had very thoroughly gone into the entire question, and had completed a design which would occupy the whole of their ground, and admit of a manufacture of 10 million cubic feet a day; thus providing for a long future for the Company. All extensions to be hereafter made would constitute a working up to the plan Mr. Lowe had elaborated; so that everything would be done in an economical way. To fully utilize their site, however, it was found necessary to provide land on which to erect a new holder of large size; and they had purchased a suitable piece of land, 2½ acres in extent. The first step to be taken, however, would be to increase the present plant; and in the course of a few months the

Engineer would commence the addition of a lift to the large holder, which would increase its capacity by 50 per cent., and make a considerable addition to the storage facilities. The Chairman added that the Directors desired to acknowledge the devotion of the staff to the Company's interests—an acknowledgment in which he said he was sure the shareholders would wish to join. The report was adopted.

In the report presented at the annual meeting of the Napier (N.Z.) Gas Company, Limited, it was stated that, in order to cope with the continued increase in gas consumption, new gasholders and new purifying plant were in course of construction at both the Napier and Hastings works. An interim dividend was paid on the 30th of June last; and there remained a balance of profit of £6708. It was recommended that a further dividend, amounting to £3747, should be paid; that the sum of £1200 should be credited to a meter fund account; and that the balance of £1761 should be carried forward.

The Directors of the Wellington (N.Z.) Gas Company reported at the recent annual meeting that in the course of the past year 7½ miles of new mains were laid, 978 new services fixed, and several additions made to the plant. In September last the share capital was increased from £200,000 to £400,000, and 6000 shares were offered to the existing shareholders at a premium of not less than £5 each. The Directors deemed it advisable to extend this privilege to the old employees of the Company; and a great many of them have become shareholders. A dividend of 5 per cent. was paid in August, and a similar amount was recommended for the past half year, for which £18,368 was available.

PUBLIC LIGHTING AT NEWCASTLE-ON-TYNE.

Cost of Gas and Electricity Compared.

According to a report respecting the cost of lighting certain thoroughfares by gas and electricity, which has been issued to the Lighting Committee of the Newcastle Corporation, the figures, based on statements by the Lamp Inspector (Mr. George Lamb) and the Tramways Manager, are as follows:—

	10-Feet Self-Intensifying Gas-Lamps at 40 Yards.		Electric Flame Arc Lamps at 80 Yards.
Westgate Road	£212 14 1	..	£324 0 0
Elswick Road	245 13 2	..	360 0 0
Scotswood Road	257 12 10	..	360 0 0
Shields Road	173 15 2	..	240 0 0
	£889 15 3	..	£1284 0 0
Mechanical operator for five years	89 2 0		
	£978 17 3		

The mechanical operator was to be arranged to allow of alternate lighting after midnight. The Lighting and Tramways Joint Sub-Committee, who had the matter in hand, stated that they desired, after careful consideration, to offer the opinion that the electric arc lamps should be allowed to remain where fixed, but that the lighting of the other main roads under discussion should be by 10-feet self-intensifying gas-lamps at 40 yards apart, and that a mechanical operator should be adopted for lighting and extinguishing. The Committee are fully convinced that, as so large an annual saving would follow the adoption of these operators, the City Lighting Committee would be justified in seeing the various forms of operators in actual work in some of the large centres where they have already been adopted. At a subsequent meeting, the Lighting Committee discussed the report at length, and then decided that it should stand over for a month.

A LIGHTING INSPECTOR ON STREET LIGHTING.

At the East Ham Town Hall, last Thursday evening, Mr. G. Dodimead, the Chief Lighting Inspector of the Gaslight and Coke Company, gave an address to lamplighters in the service of the Borough Council, in which he embodied the results of his thirty years' experience in connection with public lighting.

The lecturer began by giving an interesting *résumé* of the history of street lighting from the earliest times to the present day, and then proceeded to deal with his subject under the following headings: (1) Best type of lantern. (2) Various types of burners. (3) Proper arrangements for lighting, cleaning, extinguishing, and mantle renewals. (4) Use of uncollodionized mantles. (5) High-pressure lighting.

Taking up the first branch of his subject, the lecturer said the essentials of a good lantern were that it should be properly ventilated to ensure efficient combustion. It must also be thoroughly windproof; otherwise the light would be unsteady, and undue destruction of mantles would follow. The ribs should be small and few in number, so as to throw as little shadow as possible. The reflector should be of porcelain, and convex in shape; thus throwing the rays of light horizontally. The lecturer exhibited a specimen lantern, and also one designed by Mr. Charles Carpenter, which is used for lighting the main roads in the district of the South Metropolitan Gas Company.

Dealing next with the various types of burners, the lecturer said the one most generally employed for street lighting was the "C" burner—the same as was used for indoor purposes. It was generally installed throughout Germany; and in Berlin it was the only burner used for lighting side streets. It had remained practically unchanged since its introduction nearly thirty years ago. Producing a Welsbach-Kern burner, Mr. Dodimead said it was an excellent one for illuminating power, but it depended largely for this on frequent changing and close attention. To obtain its best lighting value, it should be taken to pieces, and the inner cone thoroughly cleaned, about once a month, or once in six weeks at the outside, otherwise the light became red, flared above the mantle, and gave a very poor result. There was also the Sugg burner, of which a large number were in use. It was more simple in construction than the Kern, required less cleaning and attention, and gave excellent lighting results. The types of burners mentioned were those most used in London for low pressure; but there was another kind which had made great strides during the past few months for street lighting purposes—viz., the inverted burner, which had been adopted to a considerable extent. With this burner, every portion of the mantle was emitting light; whereas with an upright burner only about two-thirds of it did so.

Coming to consider the proper arrangements for lighting, cleaning, and extinguishing public lamps, and also the subject of the renewal of mantles, the lecturer referred to lighting by the Foulger-Glover and the Simmance torches, both of which, he said, saved the gas consumption of the bye-pass. But as the absence of this jet allowed the mantle to absorb moisture during the day, which not only impaired its lighting efficiency but shortened its life, he thought it was worth the little expense it entailed. Reference was made to automatic lighting by the Rostin system; and then the lecturer passed on to the subject of the cleaning of lamps, which he said was the most important thing to be done in connection with street lighting. A dirty lamp, or one with smeary glass, showed at once a bad lamplighter; and such a man should be carefully watched, or he would bring more trouble and discredit than anything else. Every lamp should be thoroughly cleaned not less than twice a week. With regard to extinguishing lamps, this should be carefully and steadily done, so as to avoid jerking the cock, which might injure the mantle and possibly extinguish the bye-pass flame. Mr. Dodimead pressed upon his audience the importance of taking note of, and reporting to the foreman, all defects noticed by a lamplighter at extinguishing time. He concluded this portion of his lecture by offering a few observations on the arrangements which he had found most satisfactory for the proper working of a district, and also on the use of uncollodionized mantles.

The next subject dealt with was high-pressure lighting, which the lecturer said might be subdivided under two separate headings—viz., moderate and extreme high pressure, both of which were suitable for main roads 50 feet and more in width. He explained that by moderate high pressure he meant from 10 to 20 inches; and reference was made to the Keith system in operation at the Royal Exchange, the Mansion House, in Queen Victoria Street, at the Monument, and at Billingsgate, where 10-inch pressure was employed. The system of Messrs. W. Sugg and Co. required pressure ranging from 10 to 20 inches, according to the illuminating power wished for. Particulars were given of successful installations of this system in front of Buckingham Palace, in Whitehall, and on the new Vauxhall Bridge. The Sale-Onslow system at Victoria Station was cited as an example of the extreme high-pressure system; the gas being delivered from the compressor at about 50 inches. Mr. Dodimead said he considered this was one of the finest-lighted railway stations in the world; and the system employed in connection with it had the merit of being all-British.

After a few remarks on the "Millennium" system, which the lecturer had seen for the first time during his visit to Berlin, and complete plant for which he said he had since installed in Aldwych and Kingsway, involving the laying of more than 12,000 feet of 2-inch pipe, he introduced to his audience what he described as "the very latest thing in gas-lighting apparatus." It was the Keith inverted high-pressure lamp, which he said he had had the privilege of showing for the first time in London last May, at a lecture delivered before the Municipal Foremen's Association. He had since put four of the lamps in Kingsway; and last summer a number of them were used for the lighting of the Elite Gardens at the Franco-British Exhibition. Last Christmas Eve some of these lamps were put up for the lighting of Fleet Street and Ludgate Circus; and he understood the City Corporation were very pleased with them. They were made in various sizes, consuming from 2 cubic feet of gas per hour upwards. He believed this would prove to be the most powerful light ever known to be given by gas—it was certainly the most efficient—as it was equal to 75 candles per cubic foot of gas consumed. The best pressure for the system was about 55 inches.

In conclusion, the lecturer said the problem of street lighting was not, and never could be, finally settled. Fresh ideas and improvements came along daily; and he would be a bold man indeed who said he had reached finality in the matter. He asked his audience specially to note that very much depended upon the workmen in this matter. They should take a pride in their work, keep good time, and be genuinely interested in all that was going on. He asked them to make a special note of the following points: (1) The need of absolute cleanliness in all lanterns and burners, as the effect of a good burner was often spoilt by a dirty lantern or protector. (2) Constant and close supervision, which was imperative on the part of both foremen inspectors and assistants. (3) A systematic overhauling of every burner as often as possible by the maintenance men. (4) A very close watch on the number of mantles used, remembering always that efficiency was to be obtained before a low mantle average, but that both combined should be the aim of all. (5) Endeavour to get the lighting staff to take a personal interest in the condition of the lamps.

At the close of the lecture, Mr. Dodimead explained various points in connection with it, and was accorded a hearty vote of thanks.

Gas-Workers' Wages at Leeds.—About twelve months ago, the gas-workers at Leeds applied to the Gas Committee, through the medium of the Gas Workers and General Labourers' Union, for an all-round advance of wages. This request was delegated for consideration to the Consultative Committee—a body specially constituted of representatives of the various Committees for dealing with municipal wages and hours of employment. As a result, a reply was some days ago sent to the Union stating that the Corporation could not accede to the petition. A mass meeting of the men was subsequently held, when a resolution was unanimously adopted expressing strong disapproval and disappointment at the reply. The meeting pledged themselves strenuously to continue the agitation for the reasonable reforms asked. "We agree," continued the resolution, "to leave further action, drastic or otherwise, in the hands of the Union."

HULL CORPORATION WATER SUPPLY.

Twelfth Annual Report.

The Water and Gas Engineer of the Hull Corporation (Mr. C. B. Newton, M.Inst.C.E.) has lately issued the twelfth annual report on the water supply to the city. It shows that the total quantity of water drawn from the wells last year was 3,856,416,000 gallons; being 2,036,290,000 gallons from Springhead and 1,820,126,000 gallons from Cottingham. The greatest quantity sent out from each pumping-station in one day was: Springhead, 7,850,000 gallons, on Jan. 26; and Cottingham, 7,841,000 gallons on Dec. 24. The total quantity of water pumped was 157 million gallons more than in 1907, or 430,000 gallons per day. The consumption per inhabitant was 29·2 gallons per day, which Mr. Newton says is altogether out of proportion to the quantity used legitimately. He points out that great waste and misuse of water are taking place, which will have to be fully considered by the Water Committee. The construction of the covered service reservoir at Keldgate, recommended by Mr. F. J. Bancroft (Mr. Newton's predecessor) in 1905, was practically completed last Christmas. It is constructed of concrete, with a lining of Callender's bitumen sheeting. The roof and supporting piers are also of concrete. The internal dimensions are 324 ft. by 324 ft. by 16 ft. deep, and its working capacity is 10 million gallons. It is in electrical communication with the two pumping-stations, and also with the Engineer's office in Hull. The test for water-tightness has proved most satisfactory. The area of the district within which the Corporation are authorized to supply water is the same as before—viz., 16,377 acres, or 25·59 square miles. In addition they sell water in bulk to the Cottingham Urban District Council for the district of Cottingham, and to the Sculcoates Rural District Council for the Sutton district. They have also entered into an agreement with the latter body for the supply of water in bulk for Preston. The estimated average population supplied within the water limits during the past year was as follows: Within the city boundary, 271,137; outside, 5613—total, 276,750. During the past year, 13,398 yards, or 7·61 miles, of new mains were laid and 142 fire-hydrants fixed, and 6076 yards of mains were taken up or disused; making a net increase of 7322 yards, or 4·16 miles. The total length of mains on Dec. 31 last, was 258·39 miles.

GAS APPARATUS SUPPLY COMPANIES.

The Directors of Messrs. Stewarts and Lloyds, Limited, state in their annual report that the net profit on the past year's working, after setting aside £70,000 for depreciation, amounts to £161,155, to which is added the balance brought forward, making together £233,963. After deducting the interim dividends for the half year to June 30, at the rate of 6 per cent. per annum on the preference shares and 9 per cent. per annum on the ordinary shares, there remains a balance of £179,213. The Directors recommend the placing of £30,000 to the reserve fund, and the payment of a dividend for the six months ended Dec. 31 at the rate of 11 per cent. per annum on the ordinary shares (free of tax), leaving a balance to be carried forward of £85,963. They also recommend that an alteration should be made in the ordinary share capital, by converting the ordinary shares into 10 per cent. cumulative preferred ordinary shares, and issuing to the ordinary shareholders deferred ordinary shares to the amount of 25 per cent. of their holding. They further recommend that a bonus of £2 10s. per share (free of tax) be declared, in order to enable the ordinary shareholders to pay for these new deferred shares.

The eighteenth annual meeting of the Richmond Gas Stove and Meter Company, Limited, was held on Thursday, the 11th inst.—Mr. Thomas Dwerryhouse presiding. The Directors reported that the amount standing to the balance of the profit and loss account, after deducting debenture interest and adding the amount brought forward, was £20,699. It was recommended that this be appropriated as follows: Depreciation on buildings, patterns, plant, &c., £5763; dividend on preference capital at the rate of 6 per cent. per annum, £5933; dividend (free of income-tax) at the rate of 10 per cent. per annum on the ordinary capital for the year ending Dec. 31, 1908, £8037—total, £19,733, leaving a balance to the next account (subject to Directors' remuneration) of £966. Owing to depreciation on investments, the Directors recommended that the sum of £5000 be withdrawn from the reserve to meet such depreciation. The Company's works and various branches are in good condition, and have been maintained out of revenue. The Chairman, in moving the adoption of the report and statement of accounts and the declaration of the dividends, referred to the American financial crash, the results of which were far-reaching, and had affected them. One effect was a feeling of uncertainty among the trading community, and consequently a lock-up of capital. People who had money would not part with it, and trade was suspended, with the natural results. Competition had been as keen as —or perhaps keener than—ever; and raw materials had kept well up in prices, though at the present time they were having some relief in this direction, and they hoped it might last. Another point he referred to was the increase in the amount put to freehold and leasehold works and other buildings. There was an increase there of over £9000—£7000 in the buying-out of a lease on London premises; while the remaining portion consisted of additions to the works, plant, &c. He thought, however, looking over the whole of the year, and considering all the extraordinary circumstances, they had done very well, though they would have liked the state of affairs to have been better. Mr. H. M. Thornton (the Vice-Chairman and Managing-Director), in seconding the adoption of the report, said the item which particularly appealed to those who were actively employed in the business was the trade stocks. Whereas some years ago trade stocks were about £60,000 to £70,000, year by year they had been able to reduce this stock, until now it had reached the lowest point in the Company's history. He went on to say that they were having greater demands from the gas world generally for a more scientific article in the gas-stove business; and they had not waited for this demand to come to them, but had in the last few years laid themselves open to scientifically treat all the apparatus that went through their shops. Nothing went out that had not been previously tested and considered; and nothing was put on the market until it had gone through a course of scientific laboratory tests. They were also pressed from the artistic side. Consumers of gas were not satisfied with the old-fashioned type of years ago. The Company, therefore, had to keep up a heavy expense in pattern-making and designing to supply present-day goods; and this also was a matter that had received, and was receiving, their most serious attention. To-day they stood equal with any gas-stove manufacturer for an article produced scientifically and artistically. In conclusion, he referred to the loyalty of the staff, both in making their goods and in selling them. The report and balance-sheet were adopted.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The Edinburgh and Leith Gas Commissioners held their annual statutory meeting on Monday—Provost Smith, of Leith, in the chair—at which it was agreed that the price of gas for public lighting for next year be fixed at 2s. 8d. per 1000 cubic feet for flat-flame burners, and 2s. 4d. for incandescent lighting—a reduction of 2d. for both classes.

In connection with the proposed acquisition by the Corporation of the undertaking of the Kirkcaldy Gas Company, it is reported that a meeting of the Special Committee of the Town Council in charge of the matter was held on Tuesday, and that the report of Mr. R. Cockburn Millar, C.A., of Edinburgh, the Burgh Auditor, whom the Council had consulted upon the financial aspect of the concern, was considered. The report, it is said, strengthened the conviction of the members of the Committee that it would be a wise course to buy the undertaking; and they recommend the Council to proceed with the purchase.

The "Dunfermline Press" of to-day contains the following statement: "We learn that considerable dissatisfaction exists in Crossgates regarding the decision come to at the public meeting on Friday last week, and that an interesting development may be expected. Less than forty ratepayers took part in the vote; and those favourable to the proposals of the Dunfermline Corporation consider that the decision does not correctly represent the feeling of the inhabitants. In order that effect may be given to the views of those dissatisfied with the course of procedure that has been followed, a petition is being prepared to the Dunfermline District Committee of the Fife County Council, requesting that body to refuse to sanction the introduction of a supply of gas lighting until a plebiscite of the inhabitants has been taken." On another page, the correspondence which passed between Mr. A. Waddell, the Engineer to the Dunfermline Corporation gas undertaking and the Crossgates Committee, and a letter from Mr. T. Stewart, the Convener of the Dunfermline Corporation Gas Committee, are given. In his letter, Mr. Stewart explains that the amended offer by the Corporation was made because the offer of a supply of gas on a sliding-scale might have been misunderstood. It was not true to say that they first made an offer of gas at 4s. 6d. per 1000 cubic feet, and then reduced it to 3s. 6d. In their first communication they practically offered a partnership with the Dunfermline Corporation. Their offer was 2s. 3d. per 1000 cubic feet, *plus* interest and depreciation. Their second offer was a flat rate of 3s. 6d. Their belief was that, under the sliding-scale in their first offer, the price of gas in Crossgates would in three years have been about 3s. Such advantageous terms for a supply of gas were never offered to any similarly situated village community in Scotland, and no other corporation or company in that country could come near their price. In five years Crossgates could have had a supply of gas on the sliding-scale that no company in the radius mentioned—five miles—could have given at 6d. more and lived. Nothing could have been fairer or more advantageous to Crossgates than the offer made on behalf of the Dunfermline Corporation. Their neighbours in Crossgates had taken a foolish step, with their eyes wide open.

A special meeting of the Carnoustie Town Council was held on Wednesday, to consider the situation which has arisen by the Directors of the Carnoustie Gas Company having declined the offer of the Council to acquire their undertaking. Mr. Soutar, Convener of the Finance Committee, drew attention to an exhaustive report the Council had received from Mr. Arthur Silverthorne, which brought out that sufficient had not been written off the value of the gas-works from time to time for superseded and obsolete plant, which was really dead capital. Of the original works very little now remained but the office and the walls. The policy of the Company, Mr. Soutar said, had been that, instead of raising new capital, they had found the wherewithal for new works by keeping up the price of gas. The present capital value of the works had been mainly created by the Police Commissioners, not by the shareholders. Sufficient provision had not been made for extensions and developments, as the consumption of gas doubled in eleven years. If the Council took over the undertaking, they would have to erect a new and up-to-date retort-house and coal-stores, and the purifiers would have to be increased and modernized. Keeping all this in view, the valuation put upon the undertaking by the expert was £15,980; the Council paying in addition for all stocks, &c., at valuation, and the Company redeeming their own loans. Since 1903, the price of gas used with prepayment meters had been continued at 4s. 4½d., while with ordinary meters the charge had been reduced from 4s. 2d. to 3s. 9d. The Council offered £16,000, or, alternatively, £2 15s. per share—the Council to take over all loans, debts, and obligations, and to pay all the expenses. This was offering 275 per cent. For many years the shareholders had been getting 11¼ per cent. on their original capital. The Directors had not called together the shareholders, who would in all probability have been favourably disposed to the community. He moved that the Town Council meet the ratepayers at a public meeting to be called in May, and that the second meeting for the adoption of the Gas Act be postponed till June. In the event of failure in the negotiations, there was no obstacle in the way of coming to an arrangement with the city of

Dundee for a supply of electric light. The motion was unanimously adopted.

Mr. W. Johnstone, the Secretary of the Coatbridge Gas Company, has received notice that the Board of Trade have given their decision in favour of the Company's proposals, in their Provisional Order, to reduce the illuminating power of the gas from 20 to 15 candles, and to adopt another method of testing, in regard to which an inquiry was held in London on the 18th ult. (*ante*, p. 558). Before going to the Board of Trade, the Company offered a compromise; but the Council refused to entertain the proposal. When this decision is taken in conjunction with that given in the case of Edinburgh in July of last year, it is plain that in matters of gas supply legislators and Government officials are ahead of local bodies, in whom there are frequently some who do not perceive how the hands of the clock are advancing. In both instances, the Town Council opposed the gas measure; and in both they were worsted.

CURRENT SALES OF GAS PRODUCTS.

Sulphate of Ammonia. LIVERPOOL, *March* 20.

Demand has again been well sustained at all points, and during the week prices have gradually hardened. Although buying has been mainly for covering sales made for March delivery, direct buyers have begun to recognize the situation, and have bought more freely than has been the case with them for some time. Home demand, too, has revived, under more favourable climatic conditions. So that the closing quotations are £11 10s. per ton f.o.b. Hull, £11 12s. 6d. per ton f.o.b. Liverpool, and £11 15s. per ton f.o.b. Leith. There have been some sales in the forward position, but prices have not been reported. For May-December and July-December delivery, £11 15s. per ton f.o.b., best ports, is quoted, but no business at the price has transpired.

Nitrate of Soda.

Demand for prompt delivery is still quiet, but prices remain 10s. 3d. per cwt. for 95 per cent., and 10s. 6d. for refined quality. Business in cargoes has gone quieter, as also business f.o.b. on the west coast; and recent prices are no longer obtainable.

Tar Products. LONDON, *March* 22.

Markets for tar products have been steady throughout the past week, and pitch has improved still further. There has not been very much business done, as buyers do not appear to have become quite used to the great increase which has taken place in prices. This article seems to be very scarce; and if buyers have any need to purchase, they will undoubtedly have to pay the enhanced price at an early date. Benzol is very quiet, both in 90 per cent. and 50-90 per cent. Business continues to be done in the former at 5½d. in the North, and 6d. in London. Solvent naphtha is very firm indeed. Manufacturers appear to be well sold, and not prepared to consider any further business except at an increased price. Carbolic acid remains unchanged, though on the east coast consumers decline to advance their bids. The dealers who are short are reported to be offering rather better prices than can be obtained from the customary buyers. Creosote is steady. The principal London Gas Companies are asking 2⅞d. to 3d. per gallon, though outside oil is reported to have been purchased at 2⅞d. In the Midlands, business has been done at 2⅞d. for a fair quantity for delivery over the present year. In the North, 2½d. to 2⅝d. has been accepted; while in the Manchester district the demand remains good. Crystals are depressed, and very difficult of disposal.

The average values during the week were: Tar, 12s. 9d. to 16s. 9d., *ex* works. Pitch, London, 22s. to 22s. 6d.; east coast, 21s. 6d. to 22s.; west coast, 21s. to 22s. f.a.s. Mersey ports, 20s. 6d. to 21s. 6d. f.o.b. other ports. Benzol, 90 per cent., casks included, North, 5½d.; London, 6d.; 50-90 per cent., casks included, North, 6d.; London, 6½d. Toluol, casks included, North, 8½d. to 9d.; London, 9d. to 9½d. Crude naphtha, in bulk, North, 3½d. to 3⅝d.; London, 3½d. to 3⅝d.; solvent naphtha, casks included, North, 10½d. to 10⅝d.; London, 11¼d. to 11⅜d.; heavy naphtha, casks included, North, 10½d. to 10½d.; London, 11½d. to 11½d. Creosote, in bulk, London, 2⅝d. to 2⅞d.; North, 2½d. to 2⅝d. Heavy oils, in bulk, 3d. Carbolic acid, 60 per cent., casks included, east coast, 1s. to 1s. 0½d.; west coast, 11½d. to 11⅝d. Naphthalene, £4 10s. to £8 10s.; salts, 35s. to 37s. 6d., packages included and f.o.b. Anthracene, "A" quality, 1½d. to 1⅝d. per unit, packages included and delivered.

Sulphate of Ammonia.

This article has been steady throughout the past week, and prices have gradually improved about 2s. 6d. per ton all round. The principal London Gas Companies have done business at £11 15s., and now ask £11 17s. 6d. upon their special terms; but outside makes upon Beckton terms have been sold at £11 10s. In Hull, £11 12s. 6d. is reported to have been paid for one of the best makes; and in Liverpool £11 13s. 9d. has been taken. In Leith, £11 15s. has been accepted, and is now declined; manufacturers asking £11 17s. 6d.

New Retort-House and Plant for Rochdale Gas-Works.—The Gas Committee of the Rochdale Corporation have unanimously approved of the report presented by Mr. T. B. Ball, the Gas Manager, recommending the construction of a new retort-house with an up-to-date plant. Instructions have been given for the preparation of plans and specifications; and the Chairman of the Committee (Mr. Walker) and Mr. Ball have been deputed to inspect works where the latest plant for gas-making is in use. In his report to the Committee, Mr. Ball pointed out that to bring the old retort-house—built about forty years ago, and only used now in times of great pressure—up to modern requirements, meant an expenditure of £12,000 or more; and he suggested that it would be cheaper in the long run to put down a new building and plant, at an estimated cost of £30,000. When completed, the new retort-house would be the means of effecting a saving of £1120 a year in wages, material, upkeep, &c. It is not proposed to spend all of the £30,000 at once, but it is intended to have the first instalment of the new plant ready for use by the winter of 1910.

COAL TRADE REPORTS.

Northern Coal Trade.

There is a little ease in the Northern coal trade; the supply of steamers having been rather limited during the last few days. Prices have been well sustained, however, on the whole. In steam coals, best Northumbrians are now quoted at 10s. per ton f.o.b. For second-class steams, the price is from 9s. to 9s. 6d., and steam smalls are rather firmer at from 4s. 6d. to 5s. 6d. Work at the collieries is fairly good, with exceptions through the cause mentioned above. In the gas coal trade, there is more interest in the large contracts now in the market. The shipments are fair for the season, but are now beginning to show the fall that sets in more sharply with the spring. Durham gas coals vary in price from about 8s. 9d. to 10s. 1½d. per ton, according to quality, for the usual classes, and up to 10s. 6d. f.o.b. for "Wear specials." As to contracts, negotiations are now in progress for some of the London Companies, and also for the needs of the Newcastle and Gateshead Gas Company—the latter being for about 300,000 tons. It seems to be anticipated that, generally, the results of these will be somewhat similar to those of the Gaslight and Coke Company—based on from about 8s. 6d. to 9s. 3d. per ton f.o.b., according to quality. Some smaller contracts are also in the market—for Bergen and other Continental places. The coke market seems quieter. Good gas coke is quoted from about 10s. 9d. to 11s. 6d. per ton, but with some irregularity in the figures, according to the position of the producers.

Scotch Coal Trade.

It is reported that trade remains as it was—that there is difficulty in disposing of coal for export; and that the home trade is unchanged. Small coal is most in demand. The prices quoted are: Ell 8s. 9d. to 9s. 6d., splint 9s. 9d. to 10s., steam 9s. 3d. to 9s. 6d. per ton f.o.b. Glasgow. The shipments for the week amounted to 267,191 tons—an increase of 35,682 tons over the preceding week, and of 37,103 tons over the corresponding week of last year. For the year to date, the total shipments have been 2,394,007 tons—an increase of 194,914 tons over the corresponding period.

Durham Gas Coals.

Under the heading of "Durham Gas Coals," the "Newcastle Daily Chronicle" last Thursday said: There are many of the contracts for gas coals now in the markets; and the decision is watched with interest, for these contracts, extending over many months, do much towards determining the prices that rule. It is well known that the price of gas coals fell off during the past year. In the market, the quotations fell from about 12s. 6d. per ton in the beginning of 1908 down to about 9s. 6d. per ton at the end of the year. Many large contracts were made nearly at the middle of the year, and they represented in many cases a fall in price; and the fact that some of the great consuming countries had to record a falling off in their sales of gas had its effect in time on the gas coal trade. One of the London Gas Companies—the South Metropolitan—added to their stock of coals in store in the last six months of 1908 just about 30,000 tons; the mildness of the weather in the last quarter of the year being one of the chief of the causes. Other companies had a similar experience; and there was at any rate a check to the increase which is usual in the consumption of gas coals. But there has been somewhat of a change in the last six weeks or so; and concurrent with this there has been some stiffening of the prices for gas coals. How far it may continue will depend partly upon climatic causes, and partly on the condition of the great industries; for it is well known that the effect of the strikes on Tyneside and in other districts was very much to diminish the consumption of artificial light for the time being. Apart from causes such as that we have just referred to, there is a steady enlargement of the consumption of such illuminants; and the absence of labour stoppages this year will do something to swell the consumption of gas coal. There are other causes that are now at work to influence the prices of coals of all kinds; and it is the opinion of some experts that these influences, over a wide-spread area, will affect, temporarily at least, the extent of the output of coal and its price. We had for last year the reduction of the output by some 6,000,000 tons in this country; and this margin should be available in the future, and may lessen the effect of the latest Mines Act. As it is, the contracts for coal that are now in the market will in some degree show what some of the largest buyers and sellers expect may be the effect on the price.

Prussic Acid in Gas-Meter Water.—At a meeting of the Pharmaceutical Society of Great Britain in Edinburgh last week, Mr. D. B. Dott contributed a paper on "Prussic Acid in Gas-Meter Water," in which he reported that he had found as much as a grain of prussic acid in 100 c.c. of water taken from a gas-meter, in which it had been standing for some time. This indicated, he said, that 4 fluid ounces, or one gill, of such water contained a fatal dose of prussic acid.

A Councillor on the Limits of Municipal Trading.—In a recent lecture by Councillor J. H. Mathieson, of Glasgow, to the College Division Conservative Association, on "Municipal Trading," he stated that he believed to a certain extent in municipal enterprise; but he thought they had come to the line, and even past the line, where they must call a halt. Water, drainage, sewage disposal, the cleansing of streets, and making, policing, and protecting them, should be in the hands of the local authority. These were matters of public health and safety. He had no objection to gas, electricity, and tramways being also under municipal control, provided the accounts were thoroughly audited after proper depreciation was written off, and that everything that should be charged against a particular department was so charged. With regard to gas, well, had his works been in Sheffield—one of the homes of his competitors—his gas bill last year would have been £500 less than it was. The Sheffield Gas Company was a private enterprise, but with the public safeguarded somewhat on the lines he had indicated. While admitting what he had, he did not think that towns, however justified they might be in borrowing on the security of the rates to supply some recognized public want, should be allowed to speculate with public money on enterprises of problematical utility.

The Recent Prosecution at Brentwood.

At the conclusion of the annual meeting of the Brentwood Gas Company (at which a dividend of 8 per cent., free of income-tax, was declared), the late Secretary, Mr. C. A. Fielder, alluded to the recent case at the Essex Assizes, when Cecil Earthy was sentenced to a term of penal servitude for making false entries in the books of the Company, by whom he was employed as a clerk. In making an appeal on his behalf, prisoner's Counsel said that friendship for Mr. Fielder had been the cause of his downfall; and he endeavoured, in the course of a long statement, to show that Mr. Fielder was largely responsible for what had happened. Mr. Marshall Hall, K.C., who prosecuted, subsequently remarked that "a cowardly attack had been made on Mr. Fielder, who could not defend himself." It was under these circumstances that, after the meeting of the Company was over, Mr. Fielder said he wished to answer the unfounded charges made by Earthy's Counsel—statements which were a tissue of lies. For over 42 years he (Mr. Fielder) was Secretary to the Company. He worked hard for the business; and it was always a success. It was a sad ending to him after so many years, with no fault of his own. Earthy was in his employ for 20 years; and he placed every confidence in him. He wished to bring to their notice the cowardly speech made by his Counsel at the trial, to which he was unable to reply. Counsel alleged that he had said to Earthy that he (Mr. Fielder) was pressed for money; and that Earthy said, "Get some from the Gas Company, and pay them later on." This was an absolute lie. He also stated that Earthy had falsified the accounts for his (Mr. Fielder's) benefit. This was another lie. He would produce to the Chairman his bank-book, which would show that at the particular time when he was supposed to be hard up he had to his credit (on March 31) a sum of £1089, and at the end of the June quarter £775. Did they think it was likely he should go to his servant, when he had plenty of money? He hoped that their high opinion of him would not be lowered. Mr. S. Ray (a Director) observed that the loss to the Company through the defalcations would be small, as the Directors had called upon Mr. Fielder to repay £85 5s.

The Model Village in the Elan Valley.—The new model village which the Birmingham Corporation have established in the Elan Valley, in connection with their Welsh water supply, was formally opened last Thursday. The total outlay has been about £20,000. When the constructive work in the valley was in progress, provision had to be made for the housing of a large number of workmen, and a village of wooden huts developed on the banks of the river, two miles above Rhayader. These have now been removed; and in order to accommodate the necessary permanent staff a small village, on model lines, has been erected. In all there are about 12 houses, a school, and a single shop. The school has been built for 120 children, and it will also serve as an assembly hall. In front of the school is an open space with a fountain. Generally speaking the houses are of the cottage type, and stand in pairs, at intervals of several hundred yards, connected by a properly made road. Each cottage has four bedrooms, and on the ground floor a bathroom.

Co-Partnership between Capital and Labour.

At a recent monthly dinner of the Imperial Industries Club, the subject set down for discussion was "Co-Partnership." In the course of the debate, Mr. H. Vivian, M.P., referred to the scheme inaugurated by Sir George Livesey in the South Metropolitan Gas Company, which, he said, had been so successful that the workers now held nearly £400,000 of the capital, or an average of £60 per man, and in ten or eleven years would probably hold £1,000,000. He added that "these men's whole outlook on life had been altered by the scheme;" and he stated that from one-third to one-half of the capital of this country's gas companies was now being run on similar lines. At the recent annual general meeting of Messrs. Lever Bros., Limited, the shareholders unanimously approved the scheme of partnership certificates for employees brought forward a few weeks ago; and the necessary resolution was adopted altering the Articles of Association to enable it to be carried out.

Portadown Town Council and the Gas-Works.—At the meeting of the Portadown Town Council last Tuesday, they had under consideration a report by Mr. A. Silverthorne on the valuation of the gas-works, and decided to abandon for the present any negotiations for their purchase.

Petrol Gas Lighting for Woolacombe.—In the "JOURNAL" for the 9th inst., we announced the formation of a Company for lighting Woolacombe Bay, North Devon, by gas. It is a private undertaking; the Directors being all local gentlemen. The capital has been fixed at £1000; but it has only been necessary to call up £600. The Lady of the Manor (Miss Chichester) is assisting the scheme by leasing to the Company, on easy terms, the old lifeboat house and the old reservoir for holding the plant and motive power. Twelve public lamps are to be purchased at the start; and it is stated that there are already numerous applications for private lighting. The charge for gas will be about 4s. per 1000 cubic feet. The scheme is expected to be completed about two months hence.

Cheaper Gas for Barking.—At the recent half-yearly meeting of the Barking Gas Company, the Directors reported that the profits for the six months ending Dec. 31 amounted to £5070, and that a sum of £6930 was available for distribution. They recommended that the full statutory dividends on all classes of shares, together with £300 on account of back-dividends on the original shares, should be paid (all less income-tax), which would absorb £3889, and leave £3050 to be carried forward. The Chairman (Mr. J. Cholmeley Russell), in moving the adoption of the report, said a capital expenditure of £5415 had been incurred for extension of mains and additions to plant (under the supervision of Mr. W. B. Reidie, the Manager), rendered necessary by the growth of the Company's business, which he was pleased to say was still progressing satisfactorily. As to the future, the coal contracts for the ensuing year had been secured at a lower price, which enabled the Directors to announce that the price of gas would be reduced 2d. per 1000 cubic feet to ordinary consumers and 1d. per 1000 feet to slot consumers from July 1 next. The report was adopted.

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 839.

Issue	Share.	When ex-Dividend.	Dividend or Dividend & Bonus	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
590,000	10	Oct. 15	10	Alliance & Dublin 10 p.c.	18½—19	..	5 5 3
268,324	10	"	7	Do. 7 p.c.	12¾—13¼	..	5 5 8
310,000	Stk.	Jan. 14	4	Do. 4 p.c. Deb.	97—100	..	4 0 0
200,000	5	Oct. 29	6½	Bombay, Ltd.	5⅝—5¾	..	6 2 4
40,000	5	"	6½	Do. New, £4 paid	4—4¼	..	6 2 4
50,000	10	Feb. 25	14	Bournemouth Gas & Water 10 p.c.	28¾—29¼	..	4 14 11
51,810	10	"	7	Do. B 7 p.c.	16¼—16¾	..	4 3 7
53,200	10	"	6	Do. Pref. 6 p.c.	15¾—16	..	3 15 0
350,000	Stk.	"	12½	Brentford Consolidated	245—248	..	5 0 10
300,000	"	"	5⅝	Do. New	185—188	..	5 1 1
50,000	"	"	5	Do. 5 p.c. Pref.	120—122	..	4 2 0
206,250	"	Dec. 11	4	Do. 4 p.c. Deb.	101—103	..	3 17 8
220,000	Stk.	Mar. 12	10⅝	Brighton & Hove Orig.	203—212*	..	5 1 5
246,320	"	"	7½	Do. A Ord. Stk.	150—153*	..	5 1 4
467,000	20	Oct. 15	10	British	42—43	−½	4 13 0
109,030	Stk.	Feb. 25	6	Bromley, Ord. 5 p.c.	113—116	..	5 3 5
165,700	"	"	4½	Do. do. 3½ p.c.	84—86	..	5 4 8
500,000	10	Oct. 15	7	Buenos Ayres (New) Ltd.	12¾—13¼	−¼	5 5 8
250,000	Stk.	Dec. 11	4	Do. 4 p.c. Deb.	94—96	..	4 3 4
150,000	20	Feb. 25	7½	Cagliari Ltd.	25—26	..	5 11 6
100,000	10	—	—	Cape Town & Dis., Ltd.	4⅜—5⅛	..	—
100,000	10	Apl. 26	4½	Do. 4½ p.c. Pref.	4⅜—5⅛	..	8 3 8
52,000	50	Nov. 3	6	Do. 6 p.c. 1st Mort.	47—49	..	6 2 5
100,000	Stk.	Dec. 30	4½	Do. 4½ p.c. Deb. Stk.	76—78	..	5 15 5
157,150	Stk.	Feb. 25	5	Chester 5 p.c. Ord.	109—111	..	4 10 1
1,493,280	Stk.	Mar. 12	5⅝	Commercial 4 p.c. Stk.	106—108*	..	4 16 4
562,000	"	"	5	Do. 3½ p.c. do.	101—103*	..	4 17 1
475,000	"	Dec. 11	3	Do. 3 p.c. Deb. Stk.	81—83	..	3 12 3
800,000	Stk.	"	6½	Continental Union, Ltd.	101—103	..	6 6 3
200,000	"	"	7	Do. 7 p.c. Pref.	138—141	..	4 19 3
46,170	Stk.	"	5	Derby Con. Stk.	121—122	..	4 2 0
55,000	"	—	4	Do. Deb. Stk.	103—105	..	3 16 2
143,995	"	Sep. 30	5	East Hull 5 p.c. Ord.	95—100	..	5 0 0
486,693	10	Jan. 28	12	European, Ltd.	23¾—24¼	..	4 19 0
354,662	10	"	12	Do. £7 ics. paid.	17¾—18¼	..	4 18 5
15,161,545	Stk.	Feb. 11	4/10/8	Gas 4 p.c. Ord.	100⅝—101¼	..	4 9 3
2,600,000	"	"	3½	light 3½ p.c. max.	87½—88½	..	3 19 1
3,793,735	"	"	4	and 4 p.c. Con. Pref.	104—106	..	3 15 6
4,193,975	"	Dec. 11	3	Coke 3 p.c. Con. Deb.	84½—85½	..	3 10 2
258,740	Stk.	Mar. 12	4⅜	Hastings & St. L. 3½ p.c.	93—95*	..	3 5 0
82,530	"	"	6¼	Do. do. 5 p.c.	110—112*	..	5 11 7
70,000	10	Oct. 15	11	Hongkong & China, Ltd.	18—18½	..	5 18 11
123,500	Stk.	Mar. 12	6½	Ilford "A" and "C"	131—133*	+2	4 17 9
65,783	"	"	5	Do. "B"	102—104*	..	4 16 2
51,000	"	Dec. 30	4	Do. 4 p.c. Deb.	102—104	..	3 16 11
4,940,000	Stk.	Nov. 13	8	Imperial Continental	181—183	..	4 7 5
473,600	Stk.	Feb. 11	3½	Do. 3½ p.c. Deb. Red.	94—96	..	3 12 11
195,242	Stk.	Mar. 12	6	Lea Bridge Ord. 5 p.c.	117—119*	..	5 0 10
561,000	Stk.	Feb. 25	10	Liverpool United A	225—227	−2	4 8 1
718,100	"	"	7	Do. B	169½—171½	..	4 1 7
306,083	"	Dec. 30	4	Do. Deb. Stk.	105—107	..	3 14 9
75,000	5	Dec. 11	6	Malta & Mednt, Ltd	4¾—5	..	6 0 0
550,000	100	Oct. 1	5	Metropolitan 5 p.c. Deb.	101—103	..	4 17 1
250,000	100	"	4½	Melbourne 4½ p.c. Deb.	101—103	..	4 7 5
541,920	20	Nov. 13	3½	Monte Video Ltd.	12½—12⅝	..	5 9 10
1,775,892	Stk.	Feb. 25	4½	Newcastle & G't sn'd Con	107—108	−½	4 3 4
518,795	Stk.	Dec. 30	3½	Do. 3½ p.c. Deb.	91—93	..	3 15 3
15,000	10	Feb. 25	10	North Middlesex 10 p.c.	19½—20	..	5 0 0
55,940	10	"	7	Do. 7 p.c.	13—13½	..	5 3 8
300,000	Stk.	Nov. 27	8	Oriental, Ltd.	140—142	..	5 12 8
60,000	5	Sept. 20	8	Ottoman, Ltd.	6⅞—6⅞	..	6 5 6
31,830	53	Feb. 25	13	Portsea Island A.	135—137	..	5 0 7
60,000	50	"	13	Do. B.	129—131	..	4 19 3
100,000	50	"	12	Do. C.	119—121	..	4 19 2
114,800	50	"	10	Do. D and E.	101—103	..	4 17 1
398,490	5	Oct. 29	7	Primitiva Ord.	6¼—6⅝	..	5 7 8
796,980	5	Jan. 28	5	Do. 5 p.c. Pref.	5—5¼	..	4 15 3
488,900	100	Dec. 1	4	Do. 4 p.c. Deb.	95—97	..	4 2 6
1,000,000	10	Oct. 15	8	River Plate Ord.	14—14½	..	5 10 4
312,650	Stk	Dec. 30	4	Do. 4 p.c. Deb.	95—97	..	4 2 6
250,000	10	Sept. 30	8	San Paulo, Ltd.	14—14½	..	5 17 4
125,000	50	Jan. 2	5	Do. 5 p.c. Deb.	49½—50⅛	+½	4 19 0
135,000	Stk.	Mar. 12	10	Sheffield A	236—238*	+1	4 4 0
209,984	"	"	10	Do. B	236—238*	+2	4 4 0
523,500	"	"	10	Do. C	234—236*	+1	4 4 9
70,000	10	Oct. 29	10	South African	13½—14	..	7 2 10
6,429,895	Stk.	Feb 11	5/6/8	South Met., 4 p.c. Ord.	120—122	..	4 7 4
1,895,445	"	Jan 14	3	Do. 3 p.c. Deb.	84½—85½	..	3 10 2
209,820	Stk.	Mar. 12	8	South Shields Con. Stk.	150—152*	..	5 5 3
605,000	Stk.	Feb. 25	5½	S'th Suburb'n Ord. 5 p.c.	119—121	..	4 10 11
60,000	"	"	5	Do. 5 p.c. Pref.	120—122	..	4 2 0
117,058	"	Jan. 14	5	Do. 5 p.c. Deb. Stk.	124—126	..	3 19 4
502,310	Stk.	Nov. 13	5	Southampton Ord.	109—111	..	4 10 1
120,000	Stk.	Feb. 25	6¾	Tottenham A 5 p.c.	131—133	..	5 1 6
423,940	"	"	5¼	and B 3½ p.c.	108—110	..	4 15 5
149,470	"	Dec. 30	4	Edmonton 4 p.c. Deb.	100—102	..	3 18 5
182,380	"	"	8	Tuscan, Ltd.	8¾—9¼	..	8 13 0
149,900	10	Jan.	5	Do. 5 p.c. Deb. Red.	99—101	..	4 19 0
236,476	Stk.	Feb. 25	5	Tynemouth, 5 p.c. max.	104—106	..	4 14 4
255,636	Stk.	Feb. 25	6½	Wandsworth B 3½ p.c.	131—133	+2	4 17 9
79,416	"	Dec. 30	3	and 3 p.c. Deb. Stk. Putney	72—74	..	4 1 1
895,872	"	Feb. 25	5½	West Ham 5 p.c. Ord.	1'3—115	−1	4 11 4
210,000	"	"	5	Do. 5 p.c. Pref.	124—126	..	3 19 4
253,300	"	Dec. 30	4	Do. 4 p.c. Deb. Stk.	105—107	..	3 14 9

Prices marked * are "Ex div."

Sales of Stocks and Shares.

There was keen competition at the Mart, Tokenhouse Yard, E.C., last Tuesday, for the three new issues of capital offered, under orders from Directors, by Messrs. A. & W. Richards. The first lots consisted of £12,800 of 4 per cent. perpetual debenture stock of the Southend Water Company, which was sold at from £101 10s. to £103 10s., or an average of £102 5s. 7d., per £100. Attention was next directed to a new issue of £15,000 of ordinary "C" stock of the Wandsworth and Putney Gas Company, ranking for a standard dividend of 3½ per cent., subject to the sliding-scale, but, as the result of the recent reduction in the price of gas, entitling the holders to £5 13s. 9d. per cent. per annum in respect of the current half year. This stock was all placed at from £116 to £118, or an average of £116 10s. 1d., per £100. The last lots comprised a new issue of £7000 of consolidated stock of the Uxbridge Gas Company, ranking for a standard dividend of 5 per cent., subject to the sliding-scale (the Company's existing similar stock carrying 5½ per cent. for the past year), which fetched from £105 10s. to £110 10s., or an average of £108 4s. 8d., per £100; and £3000 of 4 per cent. perpetual debenture stock of the same Company, which was sold at par. The same day, Mr. W. T. Bowden sold at Durham some 5 per cent. maximum ordinary stock of the Hartlepool Gas and Water Company at £125 and £125 10s. per £100; some 10 per cent. maximum ordinary stock of the Weardale and Consett Water Company at from £151 to £153 per £100; a small parcel of original £10 shares in the Durham Gas Company at from £18 5s. to £18 10s. each; and a few £10 additional shares in the Bishop Auckland Gas Company at £14 10s. apiece.

The Bray Electric Light Undertaking Pays at Last.—Reference has been made at various times in the "JOURNAL" to the financial condition of the electricity undertaking of the Bray Urban District Council. At a recent meeting of the Council, there was some surprise at the announcement by the Accountant that on the year's working to the 31st inst. there will be a surplus of £124! He added, however, that next year they might be out of pocket.

Grays and Tilbury Gas Company.—In moving the adoption of the Directors' report at the recent half-yearly meeting of this Company, the Chairman (Mr. F. E. Bartlett) drew attention to the large increase in the sales of gas, more especially by means of slot meters, and the higher returns from residual products; and he congratulated the shareholders on the continued prosperity of the Company. All the extensions which had lately taken place had, he said, proved very remunerative; and he expressed great confidence in the future of the undertaking. The additional number of consumers for the past half year was 350, and the increased rental about £600, as compared with the corresponding half of the previous year. The report was adopted, and dividends at the rates of 8 and £5 12s. per cent. per annum on the "A" and "B" shares respectively were declared.

The New Issue of the Tottenham and Edmonton Gas Company.—In the "JOURNAL" for the 2nd inst., it was mentioned that the Tottenham and Edmonton Gas Company were inviting tenders for a further issue of £30,000 of "B" consolidated stock. We learn from the Secretary (Mr. E. Topley) that the issue was over-subscribed, at prices ranging from £108 to £112. Tenders at £108 10s. received 66 per cent. of the amount applied for; but those at £108 15s. and upwards were allotted in full. The average price realized was £108 19s. per £100.

Projected Extension of the Area of the Lichfield Gas Company.—The annual general meeting of the Lichfield Gas Company was held on the 9th inst.—Mr. G. Haynes presiding. The accounts for the year ending Dec. 31 having been duly passed and the statutory dividend declared, the Chairman said the consumption of gas had increased 2 per cent. and the unaccounted-for gas had been reduced to the lowest figure in the Company's history—viz., 6 per cent. The former result was due in a great measure to the increased number of prepayment meters in use, and the latter principally to the continued repair and renewal of mains and services. It was the Directors' intention to extend their mains to several of the outlying villages in their statutory area in the near future. The gas coal market being in such a variable condition, the Directors had already replenished the coal-stores, and made further satisfactory purchases to prevent an increased coal bill occurring again as was the case a year ago. The Chairman also made reference to the great loss the gas industry had suffered by the death of Sir George Livesey. In proposing a congratulatory vote of thanks to the Manager (Mr. F. Key) and the staff, he said they were second to none in their continued efforts to safeguard the Company's property and business in every possible way. The vote was heartily accorded.

Penny-in-the-Slot Consumers' Grievances at Southport.—At a meeting of the Southport and District Trades Council last Thursday, a deputation which waited upon the Gas Committee of the Corporation to ask for a reduction in the price of gas presented their report. Mr. T. C. Smith said that the Gas Committee's policy was "to keep the fellows in Park Lane" by making demands on the poorer consumers. Users of automatic meters paid 3½d. per 1000 cubic feet more than ordinary consumers. In 1899, there were 501 consumers, compared with 4050 last year; and seeing that there was a net profit last year of £14,320, and a gross profit of £31,000, it was time the price of gas was reduced from 2s. 8d. to 2s. 6d. Other speakers advocated the system of hire-purchase of grillers and fittings; and the Secretary (Mr. C. Whitmore) expressed the opinion that the present system "was a deliberate and intentional subterfuge on the part of the Gas Committee to overcharge the workers of the town as against those who got gas in the ordinary way." A man should, he added, be able to buy his fittings outright, and thus toe the line in the matter of payment with the rest of the consumers. It was admitted by another speaker that the rebate of 8d. to Birkdale stood in the way of a reduction in price from 2s. 8d. to 2s. 6d. The report of the deputation was approved; the opinion being that some concession would result to penny-in-the-slot consumers as the result of the Trades Council's action.

Serné's Patent, No. 26,486.

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Full Particulars on Application.

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Cost of Public Lighting at Croydon.—During the consideration of the estimates at the last meeting of the Croydon Town Council, Alderman Price moved the reduction by £250 of the figures for public lighting. He said that if Croydon lighting cost proportionately what it cost at Reading, the estimate would be £12,000 or £13,000, instead of £15,000 odd as at present. One reason for the great increase in the cost of public lighting was the arc lamps. Mr. Sylvester, in seconding the motion, said he believed it could not be denied that gas was cheaper than electric lighting. In the result the estimates were passed.

Dogs Assist a Meter Robber.—In a case heard at the Greenwich Police Court last Friday, in which a woman was charged with being found on enclosed premises for an unlawful purpose, an inspector of the South Metropolitan Gas Company said that for a long period the accused had been suspected of robbing meters. Accompanied by two dogs, she obtained keys of empty houses, which she entered. The dogs barked if anyone came to the house; and in this way the prisoner was warned. He had received complaints in respect of at least 300 houses during about three years. The prisoner, who declared that she had "never done anything wrong in her life," was sentenced to six weeks' imprisonment.

St. Ives Gas-Works.—Considerable discussion took place at the meeting of the St. Ives (Cornwall) Town Council last week on a proposal to erect a new gas-engine at the gas-works. It was stated that the present engine had been in use for sixteen years, and was not equal to the work required of it. The recommendation was adopted; but incidentally the financial position of the undertaking was commented upon, and Mr. Faull expressed the opinion that further capital should be raised. They had, he said, overdrawn their account at the bank; and they were spending money, not only on new machinery, but on gas-stoves, for which proper provision was not made. Alderman Reed said that applications for stoves had naturally come in after the exhibition which was held. The stoves were a good investment. In his opinion, it was better to pay for such things out of revenue than to borrow money. The gas-works cost the town £6500, of which £4500 was outstanding; and there was also £1500 owing to the bank. It had to be remembered, however, that the gas-works were much larger than when the Corporation acquired them; while against the overdraft they had a stock of coal worth £500, and £500 due from consumers. Altogether they were going on satisfactorily.

Disused Sewers in the Metropolis.—A number of Metropolitan Borough Councils have replied to the circular-letter from the Local Government Board asking them if they are in favour of the suggested inquiry into the condition of the disused sewers in the Metropolis, the danger of which in regard to forming collectors for gas was shown by the fatal explosion in Grange Road, Bermondsey, in December last. The Borough Engineer of Kensington has reported that he is not aware of any sewers in the borough which have become disused during his twenty years' official experience which have not been broken up and filled in. In Westminster it is the practice to abolish all sewers as they become disused. The Highways Committee of St. Pancras Borough Council learn that it is the invariable practice in the borough to break up all disused sewers, and fill them up solid. The Chelsea Borough Council are informed by the Surveyor that all sewers no longer in use in the borough are filled in. A return has been submitted to the Public Health and Sanitary Committee of the Southwark Borough Council as to the disused sewers there; and the Engineer is preparing a report as to the best method of dealing with them in an effective manner. In Stoke Newington, all old sewers from time to time cut off from the general system are filled in solid.

Water Supply of Saxmundham.—We learn from the Engineering Supplement to "The Times" that a scheme of water supply for Saxmundham has been prepared by Mr. P. F. Mackenzie-Richards, of Westminster. As far back as 1905, water-works were put in hand by the Urban District Council—two boreholes having been sunk to a depth of 230 feet. The diameter of these bores is 10 inches, and they are lined with steel tubes to 185 feet from the surface. Chalk was reached at a depth of 166 feet; and when tapped the water rose to within 69 feet of the ground level—the quantity being ample and the quality good, though rather hard. Difficulties, however, arose to prevent the works being proceeded with. The Council have now, however, decided to carry out the scheme in conjunction with one for the sewerage of the place prepared by Mr. Mackenzie-Richards. A pump of 4000 gallons capacity will be installed in each bore, and a gas-engine, connected to a suction producer, will operate each pump separately—the plant thus being duplicated. A concrete reservoir capable of storing 60,000 gallons of water is to be constructed at the pumping-station. It will be in two compartments, to facilitate cleaning, and covered in by a concrete roof supported by steel girders. Mains varying from 6 to 2 inches diameter are to be laid throughout the town; fire-hydrants being installed at numerous points.

Monte Video Water-Works Company, Limited.—The report of the Directors for the year 1908 shows that the gross receipts amounted to £123,324, being an increase of £8152, and the net receipts to £81,390, being an increase of £2295 on those for the previous year. To the £81,390 must be added the balance from Dec. 31, 1907, interest on deposit in London, and transfer fees, making a total of £118,255. After deducting debenture interest, income-tax, interim dividend on share capital, interest on instalments on new shares and on calls paid in advance, and the expenses of the issue of new shares, there remains £75,442. The Directors propose to pay a final dividend of 4 per cent. on the fully-paid share capital, making a total of 7 per cent. for the year, tax free, to place £5000 to the depreciation fund (raising it to £35,000), £15,000 to the reserve fund (making the aggregate reserve £115,000), and to carry forward £35,442. The ratio of working expenses has increased during the year to 34 per cent., against 31·32 per cent. in 1907. This is attributable to the reduction in the tariff, the increased cost of materials, and higher wages. The number of services in operation at the end of last year was 16,536, compared with 15,388. The Company's new gravitation-main has been completed and tested, and is now available. The new steel pumping-main has been laid for more than half its length, and is expected to be finished about July next. The new engine at the pumping-station has been erected, and connected with the existing pumping-main.

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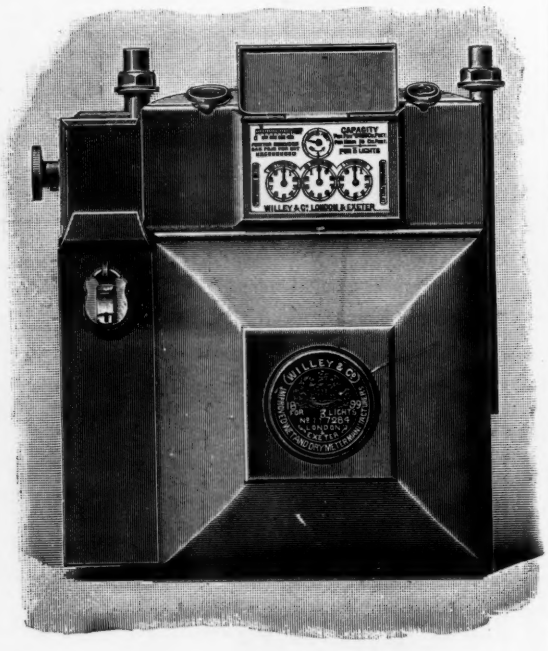

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AGENTS FOR SCOTLAND

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Price of Gas to Prepayment Consumers in Manchester.—Mr. Jennison's resolution that the price of gas to consumers using penny-in-the-slot meters be the same as that charged to users of ordinary meters was not reached at a special sitting of the Manchester City Council last week; consequently, with other matters, it stands over.

San Paulo Gas Company, Limited.—In the report which the Directors of this Company will present at the annual general meeting next Friday, they state that the profit on the working of the undertaking in the past year was £39,572. Adding dividends on investments and the carry-forward, there is a total of £46,016. After providing for interest on debentures, debenture redemption, stamp duty on new capital, and the interim dividend on the ordinary shares, there remains a balance of £30,871. After transferring £5000 to the reserve account and writing £5000 off the cost of the new gasholder, the Directors recommend a further dividend on the ordinary shares of 5 per cent., free of tax, making 8 per cent. for the year; leaving £6539 to be carried forward. The total number of public lamps at the end of the year was 5220—an increase of 452; the quantity of gas consumed in the public lighting was 8 per cent. more than in 1907. The consumption of gas by private consumers continues to increase, notwithstanding the keen competition of electricity. The quantity sold last year for private consumption was 12 per cent. in excess of the sale in 1907.

The results achieved by replacing a steam plant by a suction-gas engine at one of the pumping-stations at Maldon have induced the Town Council to order a Hornsby-Stockport engine and producer for their Spital Road pumping-station, where the existing steam plant will in future be used as a stand-by.

At the commencement of a meeting of Trade Unionists at South Shields last Thursday, the electric light failed, and candles and lamps had to be obtained for the platform and the reporters. Some other parts of the town suffered similar inconvenience, as there had been a breakdown at the Corporation electricity works.

The question of improving the water supply still continues to occupy public attention at Exmouth. Boring at the trial hole at Dotton, near the town, has been suspended for about two months, owing to the steel chisel breaking off and falling to the bottom of the borehole. The chisel has now been recovered, and boring is being continued; and it is hoped that in the course of a week or so the pumping test will take place to decide whether the anticipated supply from this source will be sufficient for the needs of the town.

George Smith, an employee of the Hornsey Gas Company, has been presented with an illuminated testimonial and a purse of money from the staff of the Company, in recognition of the prominent part he played in the endeavour to capture the two men responsible for the Tottenham outrage early in the year. It was stated by the Engineer and Manager, Mr. J. W. Buckley, who made the presentation, that Smith was brave enough to seize one of the men, at great risk to his own life, as his captive was armed with a loaded revolver, and that he held the man some time during which he was shot at by the other.

Messrs. B. Gibbons, jun., Limited, of Dudley, send a copy of a newly issued catalogue of their fire-clay goods. This has, in every way possible, been brought right up to date, and contains a large number of illustrations of retorts, bricks, blocks, &c., both of the ordinary sizes and of special types. There are also some interesting photographs of retort-settings in course of construction by Messrs. Gibbons, and of settings put up by them that have been at work for long periods. At the end of the catalogue, there are some useful tables and memoranda. In the course of a brief introduction, the firm state that, by the purchase of a considerable area of land, they still have clay of the same quality as they have used for over 70 years; and the quantity is sufficient to last them fully 25 years, at the present output.

APPLICATIONS FOR LETTERS PATENT.

5499.—Rose, A., and Bellamy, W., "Gas-regulator." March 8.
5549.—Deselle, C., "Gas-furnace." March 8.
5568.—Meker, G. A. H., "Burners for producer gas." March 8.
5572.—Ruddiman, J., "Gas-cleaners." March 8.
5576.—Mannesmann, C., "Inverted burners." March 8.
5581.—Oswald, T. H. & T. H., jun., "Suction-gas plants and engines." March 8.
5592.—Hughes, W. B., "Gas heating-apparatus." March 8.
5598.—Bagrachow, G., "Mantle." March 8.
5618-9.—Gill, J., "Manufacture of ferric oxide." March 9.
5652.—Moores, W., and Parsons, J. R., "Gasifying air." March 9.
5718.—Davis, E. J., "Suction-gas plant pressure-gauge." March 9.
5724.—Clarkson, G. J., "Operating valves." A communication from A. Boyd. March 10.
5756.—Ruscoe, J., and Co., Ltd., and Hopkinson, A., "Facing the mouths of retorts." March 10.
5760.—Wilson, L. E., "Means for creating sparks, applicable for use in gas lighting." March 10.
5768.—Schmiedt, E., "Gas-purifying apparatus." March 10.
5833.—Tollenaar, C. K., and Wilson, C. A., "Gas-stoves." March 11.
5836.—Crossley, G., "Mantles." March 11.
5853.—Howden, J., "Gas-turbines." March 11.
5886.—Schmitz, W., "Inverted burners." March 11.
5918.—Mackay, J., "High-pressure automatic gas lighting and extinguishing apparatus." March 11.
5963.—Browning, E. M., "Incandescent burners." March 12.
5972.—Breeden, J., and Co., Ltd., and Breeden, F., "Gas-lamps." March 12.
5997.—Harris, H. W., "Controlling at predetermined times the lighting and extinguishing of gas, the flow of fluids, &c." March 12.
6024.—Baron, E., "Incandescent burners." March 12.
6027.—Hall, F. H., "Gas lighting." March 12.
6044.—Wakefield, H., "Inverted burners," March 13.
6104.—Ljungstrom, B., "Gas-turbines." March 13.

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The Directors of the Bombay Gas Company, Limited, have declared a final dividend of 3½ per cent., which, with the interim dividend, makes a total of 6½ per cent. for the past year.

Mr. H. M. Tysoe some days ago lectured before the Blackheath Literary and Debating Society on "The Recovery of Buried Sunlight." He dealt with the history, manufacture, and uses of coal gas, and gave his audience some valuable "wrinkles" as to the proper treatment of the incandescent gas burner and mantle. He said large mantles were often seen fitted on burners obviously designed for smaller ones; the idea (which was quite a mistaken one) being that the larger the mantle the greater was the light given off. A loosely fitted mantle was subject to vibration, which was one of the causes of shortening its career. Another cause was dust, which might deposit on the burner or on the mantle. To keep the burner in condition, it should be periodically cleaned. In dust-laden atmospheres, smoke-diffusers should be fitted to the top of the chimney or shade.

At the City Coroner's Court last Wednesday, Dr. F. J. Waldo held an inquest on the body of Alfred John Barsham, aged 19, who was fatally injured at the works of Messrs. Parkinson and W. & B. Cowan, Cottage Lane, City Road, on the 9th ult. The evidence showed that the deceased was fitting a new handle to a file by placing it against a lathe and forcing the file into it. In doing this he slipped, and the point of the file pierced his stomach. First aid was rendered by the deceased's brother, a doctor was sent for, and the young man removed to St. Bartholomew's Hospital, where an operation was performed. It was, however, of no avail, and he succumbed last Tuesday to the effects combined with an abscess on the liver. A foreman brass finisher who has the training of most of the men working in the room with the deceased, said the method of fitting on the handle employed by Barsham was not by his instructions, and there were no specific directions to the workmen on the subject. The Jury returned a verdict of "Accidental death."

WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

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Meeting.

British Gaslight Company. Chief Office. March 31. Twelve o'clock.

TENDERS FOR

Coal and Cannel.

Broadstairs Gas Company. Tenders by April 6.
Cheltenham Gas Company. Tenders by April 3.
Newport (Fife) Gas Department. Tenders by April 2.
Montrose Gas Company. Tenders by April 1.
Isle of Thanet Gas Company. Tenders by April 7.

Condensers, Washer, Scrubbers, &c.

Oswaldtwistle Urban District Council. Tenders by April 8.

Fire-Clay Goods.

Burton-on-Trent Corporation. Tenders by April 5.
Oswaldtwistle Urban District Council. Tenders by April 8.
Skipton Gas Department. Tenders by March 30.

Gasholder and Tank (including Excavations, &c.).

Burton-on-Trent Corporation. Tenders by April 5.

Retort-House Extensions, Machinery, &c.

Skipton Gas Department. Tenders by March 30.

Retort Settings, Furnaces, &c.

Burton-on-Trent Corporation. Tenders by April 5.
Oswaldtwistle Urban District Council. Tenders by April 8.

Tar and Liquor.

Gainsborough Gas Department. Tenders by March 30.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

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Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

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See Illustrated Advertisement March 2, p. 821.

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